THE LINK BETWEEN EXERCISE DEPENDENCE AND EATING DISTURBANCE IN FEMALES

BY

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CONTENTS

ABSTRACT

Although it has been known for some time that excessive exercise is one of the features of eating disorders, it is only in more recent years that specific attempts have been made to explore the link between exercise dependence (compulsive exercising) and eating disturbance. This study explored the relationship between exercise dependence and eating disturbance in females and compared the relative influence on level of eating disturbance of exercise dependence, pressure for thinness, and competitiveness.

In order to examine the relationships between these variables, four groups were included in the study: ballet students (n=32), competitive swimmers (n=34), music students (n=33), and a control group of psychology students (n=51). Each group was hypothesised to have different levels of and combinations of exercise dependence, pressures for thinness, and competitiveness: ballet students (pressures to be thin, pressures to exercise, and competitive); swimmers (pressures to exercise and competitive); music students (competitive); and psychology students (control group, presumed to be comparably lower on all three variables).

Results indicated that groups with higher levels of exercise dependence did not necessarily show greater eating disturbance (swimmers had relatively high scores on exercise dependence, but had the lowest eating disturbance). Pressures for thinness and factors related to concerns with weight and dieting appeared to be the strongest determinant of eating difficulties, with competitiveness showing little influence on level of eating disturbance.

CHAPTER 1

SUMMARY OF CONTENTS

It has been known for some time that excessive exercise is one of the features of eating disturbance. However, it is only in more recent years that attempts have been made to investigate the relationship between exercise dependence (compulsive exercising) and eating disturbance. The aim of the current study was to further explore this link between exercise dependence and eating disturbance, as it has been debated in the literature as to whether exercise dependence can, in itself, lead to increased disturbance of eating, or whether it is a secondary characteristic of eating disturbance. As part of the study, the relative contributions to eating disturbance of exercise dependence, pressure for thinness, and competitiveness, were investigated.

Chapter 2 reviews the literature with a specfic emphasis on the relationship between exercise dependence and eating disturbance. Most of the literature reviewed suggests that exercise dependence is either an independent phenomenon to eating disturbance or is a secondary characteristic of eating difficulties. Following from this, people who have high levels of exercise dependence do not necessarily have or develop eating disturbances. On the other hand, people with disturbed eating patterns often show profiles of exercise dependence. The literature indicates that pressures for thinness and concerns with weight and dieting are important determinants of eating disturbance, but that competitiveness appears to be poorly related to difficulties with eating.

Chapter 3 presents the methods employed in the study. It includes the purpose of the research, as well as information on the subjects, the instruments used, and the statistical procedures employed.

Chapter 4 presents the results of the study. It includes demographic data and descriptive statistics, a multiple correlation, one-way ANOVAs, and a stepwise regression.

Chapter 5 discusses the relative influences of exercise dependence, pressures to be thin, and competitiveness, on levels of eating disturbance, by drawing on the data from the different groups of subjects. Conclusions, limitations, and recommendations for future research are then outlined.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Selvini-Palazzoli (1974), wrote that the earliest account of anorexia nervosa (AN) appears to have been given by Simone Porta, a sixteenth century Genovese. However, controversy exists as to exactly who first described AN. It is thought to have been Sir William Gull, a British physician, who provided us with the term AN in 1874. His general description of AN is remarkably similar to its current description (Di Nicola, 1990), except that a century later Gerald Russell established the distinction between AN and a further subtype, bulimia nervosa (BN) (Russell, 1979).

The essential feature of AN is "... the relentless pursuit of thinness..." (Bruch, 1973:4), accompanied by, as stated in the DSM-III-R, an "intense fear of gaining weight or becoming fat, even though underweight" (American Psychiatric Association, 1987: 65). The DSM-III-R adds that there is also a distorted body image and amenorrhea in females. The core feature of BN is "an irresistible urge to overeat ... followed by self-induced vomiting or purging" (Russell, 1979:429). Although the bingeing is usually terminated by vomiting, other methods may be used. The DSM-III-R lists these as: taking laxatives or diuretics, strict dieting, or vigorous exercise to control weight. As in AN, BN is characterised by abnormal concerns about body size and shape, as well as "a morbid fear of becoming fat" (Russell, 1979:429).

The incidence of AN varies considerably across different populations, with certain groups being at special risk (Russell, 1985). For example, whereas the prevalence of AN in Monroe County, USA was 0.64 per 100 000 (Jones et al, 1980), prevalence figures were very high in small samples of fashion students (3.5%) and professional ballet dancers (7.6%) in Canada (Garner & Garfinkel, 1980).

There is evidence of a sharp increase of AN over the last 50 years (Jones et al, 1980). There has also been a rise in the incidence of BN over the last 20 years (Ruderman & Besbeas, 1992).

Numerous factors (socio-cultural, familial, developmental, biological) have been posited as causing or being related to eating disorders (Hsu, 1983). Only in the last few years have interesting, and sometimes controversial, attempts been made to explore the links between eating disorders and excessive exercise (Eisler & le Grange, 1990). The present research focuses on the relationship between exercise dependence and eating disturbance, but also considers the relative importance of the contribution of other variables to eating disorders, in particular, the pursuit of thinness and competitiveness. Relevant literature pertaining to these variables and to the population groups being considered (ballet students, swimmers, music students, and psychology students), will now be reviewed.

2.2 EXERCISE AND EATING DISTURBANCE

Although it has been known for some time that excessive exercise is one of the features of eating disorders, it is

only in recent years that specific attempts have been made to explore the links between these two behaviours (Eisler & le Grange, 1990; Le Grange & Eisler, 1993). One important reason for looking at the relationship between excessive exercise and eating disorders, is the fact that dieting and exercise are both means of weight reduction and control.

For many years the beneficial physical and psychological effects of exercise have been emphasised and extolled; it has been associated with reduced risk for coronary heart disease, and recommended in the prevention and treatment of hypertension and obesity, as well as psychological problems such as anxiety and depression (Hauck & Blumenthal, 1992; Ogden et al., 1993). However, more recent research suggests that exercise may have harmful effects and become maladaptive and there has been an increased focus on 'exercise addiction'(Ogden et al, 1993). Numerous related and often interchangeable terms have been used over the years to describe the phenomenon of compulsive exercising, which has primarily been studied in runners. De Coverley Veale (1987) lists some of these terms: 'running addiction', 'negative addiction', 'running anorexics', 'obligatory runners', and 'morbid exercising'. De Coverley Veale (1987), himself, used the term 'exercise dependence', whilst Eisler & le Grange (1990) use 'excessive exercising'.

Yates et al (1983) proposed that 'obligatory running' was an analogue of AN. Yates argued that 'obligatory runners' have many characteristics in common with AN patients. The study looked at 60 male long-distance runners. The researchers noted that a few of these athletes were worried about diet and percentage body fat, rigidly adhered to schedules, appeared

isolated and overly serious, and were unable to stop running even when injured. When disabled, they became angry and depressed and convinced that their bodies were rapidly deteriorating. On the basis of this study, Yates et al. (1983) proposed that a few runners functioned in a similar manner to eating-disordered women.

This controversial proposal generated much heated debate. Since 1983, many studies have investigated the relationship between obligatory running and eating disorders (De Coverley Veale, 1987; Nash, 1987; Szmukler & Tantam, 1984; Yates et al., 1993). Most of these studies fail to provide significant support for the relationship between compulsive exercise and AN (Hauck & Blumenthal, 1992). For example, using the Eating Attitude Test (EAT) and the Eating Disorders Inventory (EDI), Weight & Noakes (1987) found that the incidence of abnormal eating attitudes and AN was no more common among competitive female runners than in the general population. Similarly, Nash (1987) states: "Despite anecdotal evidence that seems to support the premise that a small percentage of compulsive runners share personality traits with anorectic patients, recent research suggests that there is virtually no connection between the two groups" (p.235).

Eating disturbance has been a matter of concern in sports other than running. Yates et al (1994) sum up the findings of research investigating disturbed eating behaviour in athletes, and in particular women athletes, by stating that, although runners and other athletes show more disturbed eating attitudes than controls, their scores are typically well below those of eating-disordered patients. (Eating disturbance in female athletes will be discussed in greater detail later in

this chapter).

Central to the discussion around the relationship between exercise dependence and eating disturbance is whether the exercise dependence is primary or whether it is secondary to the eating disturbance. De Coverley Veale (1987) explained that the essential means of differentiating primary exercise dependence from an eating disorder (in which the exercise dependence is secondary), is to clarify the ultimate purpose of the exercise. In primary exercise dependence, the exercise is an end in itself, and is independent of an eating disorder; any dieting and weight loss is motivated by the desire to improve performance. On the other hand, in secondary exercise dependence, the exercise is a characteristic feature of AN or BN, is used primarily to lose and control weight, and is associated with a morbid fear of fatness (De Coverley Veale, 1987; Ogden et al., 1993).

Eisler and le Grange (1990) suggested that the supposed link between excessive exercising (EXE) and eating disorders can be understood in at least four different ways. They proposed four models, which although not mutually exclusive, did imply different aetiological mechanisms as well as providing theoretical and practical bases for future research. Models I and II are not particularly controversial. Model I proposes that EXE is either secondary to AN, or is an independent syndrome and implies that the similarity between the two syndromes is superficial; although there may be likenesses in presentation, they do not share the same fundamental aetiologies. Much research provides support for this model (cf. Hauck & Blumenthal, 1992; Nash, 1987). Model II proposes that AN and EXE are overlapping groups and that EXE, in

itself, can lead to the development of an eating disorder. It implies, therefore, that individuals who exercise excessively put themselves at risk for developing an eating disorder. This can either be caused by starvation dependence induced and reinforced by EXE (Szmukler & Tantam, 1984, in Eisler & le Grange, 1990), or by EXE having the effect of reducing food intake (Epling et al., 1983). There is far less support for this model (Hauck & Blumenthal, 1992). Model III suggests that AN and EXE are both related to some other underlying disorder, the most likely being affective disorder, followed by obsessive-compulsive disorder. The authors assert, however, that this model does not imply causality and is unlikely to find empirical support. The possiblity that another disorder might predispose to both AN and EXE, however, cannot be excluded. For example, Owens & Slade (1987) concluded that, while female marathon runners and anorexics resembled each other on a scale of "Perfectionism", similarities between the two groups were superficial and did not reflect similarities at a more fundamental, causal level. Model IV proposes that EXE is a variant of eating disorder and that their aetiological matrices overlap significantly. In other words, the model implies that AN and EXE are only superficially different manifestations of, in effect, the same disorder. This model was implicit in the argument posited by Yates et al. (1983). These four models provide a useful framework for examining the relationship between EXE and eating disorders.

To date, the vast majority of research studying the relationship between exercise dependence and eating disorders has been conducted with runners (Hauck & Blumenthal, 1992), and there is doubt as to whether the findings can be generalized to other athletic populations (Yates et al.,

1994). Many of the studies in this area have been in the form of anecdotal case reports and where there have been controlled studies, their results are problematic because of methodological deficiencies (Eisler & le Grange, 1990). There is a lack of consensus regarding the definition of exercise dependence, which has made comparisons between studies difficult. Furthermore, there is a paucity of standardised psychometric measures of this phenomenon which add to the lack of agreement regarding its prevalence (Blumenthal & Hauck, 1992).

Ogden et al. (1993) have gone some way toward addressing some of these inadequacies by developing the Exercise Dependence Questionnaire. The questionnaire includes both traditional biochemical criteria for addiction (e.g. tolerance and withdrawal symptoms) as well as psychosocial perspectives (e.g. interference with other areas of life). The scale has numerous advantages over previous scales. It is geared not only toward measuring running addiction, but may also be used to measure dependence in other exercising populations. Additionally, it examines the relationship between exercise dependence and eating disorders. This may be regarded as having been a significant omission in previous tests in light of the debate in recent literature as to whether exercise dependence is a characteristic of and secondary to AN and BN, or whether it is an independent problem (Ogden et al., 1993).

De Coverley Veale (1987) proposed diagnostic criteria for 'exercise dependence' to facilitate recognition of this phenomenon as a distinct diagnostic entity, but it is not yet recognised as such (Ogden et al., 1993).

2.3 PRESSURES TO BE THIN AND EATING DISTURBANCE

While the link between exercise dependence and eating disoders has only really been explored in more recent years, the relationship between pressures to be thin and eating disorders has been studied for longer, with more methodological rigour, and with more conclusive findings. Pressures to be thin and their effects on women can be looked at from two perspectives. Firstly, consideration can be given to the pervasive sociocultural expectations of thinness, to which women in general in Western culture may be susceptible (Wiseman et al., 1992). Secondly, participants in certain activities (including various athletic pursuits such as ballet and gym) which have an augmented emphasis on thinness and aesthetic appeal, are at an even higher risk for developing eating disorders because they often severely restrict their diet to attain optimal body weight and appearance (Yates et al., 1994; Gordon, 1990).

Bruch (1973) linked the sociocultural pressures for thinness to the increased incidence of AN, and indicated that fashion's ideal may affect vulnerable adolescents who equate weight control with self control and believe that the former will lead to beauty and success (Bruch, 1978). Garner et al. (1980) indicated that there had been a significant trend toward a thinner standard in the previous 20 years, by collecting data from Playboy centrefolds and Miss America Pageant contestants. Wiseman et al. (1992) reviewed the literature on cultural expectations of thinness in women and concluded that "the findings suggest that the overvaluation of thinness continues and thinness is now sought through both dieting and exercise" (p.85).

Borgen & Corbin (1987) found that athletes who were in activities with an emphasis on leanness, indicated greater tendencies towards eating disorders (by scoring higher on EDI subscales such as Drive for Thinness, Bulimia, and Body Dissatisfaction), compared with athletes participating in activities in which leanness is considered less important.

2.4 COMPETITIVENESS AND EATING DISTURBANCE

Contemporary Western culture is highly competitive, and the resultant pressure upon many individuals is thought to be one of the factors which may increase the risk of eating disturbance in vulnerable individuals (Gordon, 1990). Griffin-Pierson (1990) defined competitiveness as: "an achievement motive or component of achievement motivation that involves interpersonal and/or goal strivings for excellence". The prevalence of eating disturbance in various competitive environments has been investigated e.g. in the vocational and academic/student setting, as well as with athletes.

Selvini-Palazzoli (1974) suggested that professional career women often equate success and beauty with the cultural stereotype of thinness and, hence, vulnerable individuals may develop an obsession with dieting and weight control.

Hamburg & Herzog (1985) investigated the prevalence of eating disorders in female medical school students, as they felt that high stress levels may constitute a possible risk for these students developing eating disorders. They found that 15.7% of their sample of 121 female medical students met criteria for a diagnosis of BN or AN. The eating disordered students cited academic and work pressure as the major reason for eating

disturbance; as academic pressures increased, so did difficulties with eating.

Research has also explored the prevalence of eating disturbance in competitive female athletes. Yates et al. (1994) state that competition appears to increase the tendency toward pathogenic eating behaviour. Certain sports such as running and gym demand perfection or a 'personal best' and success may be evaluated in precise units of measurement. This reinforces the importance of being compulsive about all aspects of one's sport, including diet and weight control.

Numerous authors, however, feel that a competitive environment alone is insufficient to lead to an increase in eating disturbance. For example, Futch et al. (1988) concluded that this was the case in their study with female medical students, whom they found to be at no greater risk than the average undergraduate student for developing an eating disorder; this was so even though the medical students were immersed in an apparently more competitive environment, as suggested by their higher scores on the "Perfectionism" subscale of the EDI, which measures excessive personal expectations for superior achievement (Garner et al., 1983).

Similarly, it has been shown that competitive female athletes in certain sports, such as long-distance running, do not necessarily exhibit greater eating disturbance than the general population (Weight & Noakes, 1987). Furthermore, competitive female athletes frequently do not show the same patterns of disturbed eating as those with clinical eating disorders (Owens & Slade, 1987; Warren et al., 1990). The competitive athletes who show the greatest disturbance in

eating are those participating in sports in which there is an emphasis on leanness and body image, such as gym (Yates et al., 1994). Where there are pressures to be thin, intense competition may exacerbate drives towards leanness and hence increase vulnerability to eating disturbances; ballet dancers compete to achieve thin, aesthetically pleasing body shapes. Garner and Garfinkel (1980) found that more competitive ballet schools had twice the prevalence of clinical AN cases (7.6%) of a less competitive ballet school (3.8%).

2.5 EATING DISTURBANCE IN BALLET DANCERS

In ballet there are particularly intense pressures to attain a thin body shape, which is necessary to meet the contemporary aesthetic standards of this art form (Gordon, 1990). Because of this emphasis on leanness and body image, Garner and Garfinkel (1980) hypothesized that ballet dancers would be especially vulnerable to eating disturbances. They found that 37.7% of ballerinas had EAT scores at or above the cut-off point of 30, compared with 12% in a control group of undergraduate university students. Numerous subsequent studies have reported the vulnerability of ballet dancers to eating disorders (Braisted et al., 1985; Garner et al., 1984; Hamilton et al., 1985; Le Grange et al., 1994; Weeda-Mannak & Drop, 1981).

Le Grange et al. (1994) used the EAT to investigate the prevalence of disturbed eating amongst 49 female ballet students at the University of Cape Town Ballet School. Eight students (16%) scored 30 or more on the EAT and could therefore be considered at risk for the development of an eating disorder.

Szmukler et al. (1985) studied the prevalence of eating disturbance in 100 female ballet students and also found that 16% had scores of 30 or more on the EAT.

Pierce et al. (1993) investigated exercise dependence among female ballet and modern dancers. They noted that a number of researchers had suggested that exercise dependence is paralleled by a tendency towards eating disorders, such as AN and BN. They hypothesised that, because a high incidence of eating disorders has been reported in dancers, and because of the rigorous physical demands inherent in dance, dancers would present a higher profile of exercise dependence on the Negative Addiction Scale than other female athletes. They found that ballet dancers did indeed score significantly higher on exercise dependence than endurance (running) athletes and non-endurance (field hockey) athletes. They argued that in certain sports success can be achieved with varying body shapes and sizes, but in dance there is a predetermined thin aesthetic ideal which must be adhered to if success is to be obtained; exercise might thus be one way of optimising body composition. In addition to the pressure on dancers regarding body image, dependence on exercise may be further increased because they also have to be fit, strong, and technically highly proficient; in order to achieve these qualities, they have to adhere to rigid intense training programmes. The authors noted that the relationship between eating disorders and exercise dependence was not directly examined in their study, and they suggested that further research was needed to examine the links between eating disorders, exercise dependence, and perceived body-image.

2.6 EATING DISTURBANCE IN COMPETITIVE SWIMMERS

Only a few studies could be found in the literature which investigated eating disturbances in female swimmers. Rosen et al. (1986) explored the prevalence of pathogenic weight control behaviour in female college athletes since "to achieve optimum performance, athletes have gone to extraordinary lengths to reduce their body fat stores" (p.79). Results showed that swimmers did not appear to be at risk for pathogenic weight-control behaviour.

Dummer et al. (1987) examined pathogenic weight-control behaviour in 487 young female competitive swimmers (aged 9-18). They found that 15.4% of the girls used pathogenic weight-loss techniques (self-induced vomiting and use of laxatives, diuretics, and/or diet pills). Subjects were asked what motivated them to use pathogenic weight-control methods. The problem appeared to be most strongly related to sociocultural factors emphasizing the merits of thinness for women, rather than to demands from coaches for swimmers to be thin or from the perception that performance requires thinness.

Brooks-Gunn et al. (1988) researched attitudes toward eating and body weight in different groups of female adolescent athletes. Instruments used were the EAT-26 (Garner et al., 1982), which was adapted for use with adolescents, and the Perfectionism subscale of the EDI. Results showed that ballet dancers scored significantly higher than both swimmers and nonathletes on all subscales of the EAT as well as on Perfectionism. Five percent of ballet dancers scored above the cut-off on the EAT, corresponding to findings by Garner and

Garfinkel (1980) for adolescent dancers. On the other hand, none of the swimmers or nonathletes were above the cut-off point. Dancers were lighter and leaner than swimmers, in accordance with the weight requirements of the former group. The authors postulated that the higher eating problem scores of the dancers were, likewise, probably indicative of professional demands for low weight: there is an emphasis on leanness in ballet, but not in swimming. Borgen & Corbin (1987) classified ballet as an activity with an emphasis on leanness and swimming as having no emphasis on leanness.

2.7 EATING DISTURBANCE IN MUSIC STUDENTS

It would appear from reviewing the literature that the only study which has investigated eating disturbance in music students, was that by Garner and Garfinkel (1980). The authors were interested in the specific role of very competitive settings in the development of AN; in these settings there are high performance-expectations and intense pressures to achieve.

They wondered whether the highly competitive environment of the ballet schools could, by itself, be responsible for the high incidence of AN, rather than the specific expectations for thinness being the cause. Accordingly, they evaluated 35 music students from a private professional-calibre conservatory, closely matched for age to the ballet students; the conservatory was presumed to have a demanding, competitive environment comparable to the ballet schools, but one in which body shape was irrelevant to professional achievement.

The music students scored much lower on the EAT than the

ballet students and were indistinguishable from the college student control group. The mean EAT score for the music students was 13.7, whilst this was 25.9 for the ballet students. Only 3% of the music students had EAT scores greater than or equal to 30, compared with 43% of the ballet students. The authors concluded that a competitive setting alone did not lead to a greater expression of AN symptoms (see COMPETITIVENESS AND EATING DISTURBANCE). They added, however, that these results were inconclusive since the music group was small and younger than the optimal age for the expression of AN (Crisp et al., 1976). Furthermore, as Garner and Garfinkel (1980) pointed out, 'performance expectations' were not directly measured.

2.8 EATING DISTURBANCE IN UNDERGRADUATE (PSYCHOLOGY) STUDENTS

Much research investigating eating disturbance has been conducted with undergraduate female students, and often these are, more specifically, psychology students.

Raciti & Norcross (1987) used the EAT and EDI to assess weight preoccupation in female college freshmen. Using the EAT, they identified 12% as weight-preoccupied (EAT>=30), whilst on the Drive for Thinness scale of the EDI, they found a prevalence of 8% (Drive for Thinness>=15). They noted that this was consistent with results from numerous similar studies which yielded prevalence rates ranging from 6 to 13%. As the authors point out, the EDI Drive for Thinness subscale is a more conservative estimate of weight-preoccupation.

Kurtzman et al. (1989) used the EDI to determine the prevalence of eating disturbance in university subgroups,

including undergraduate dance majors, athletes, and a large undergraduate psychology class. They believed that the psychology class would serve as a "low prevalence" control group, but discovered that the results indicated otherwise. For example, although dance majors showed the highest level of eating disturbance of the above three groups, psychology students showed greater difficulties with eating than athletes. Furthermore, Body Dissatisfaction was similar for dance (11.9) and psychology (11.3) students, with athletes much lower (7.8). Klemchuk et al. (1990) used the EDI to investigate body dissatisfaction and eating-related problems on two college campuses. In a sample of introductory psychology students, they found a mean score of 11.8 for Body Dissatisfaction and noted that "the high degree of body dissatisfaction among college women is striking and disturbing" (p.303).

Perhaps related to this high level of body dissatisfaction among female students, is the finding by Hart and Ollendick (1985), that 5% of female students had BN compared to 1% in working women. They speculated that students were subject to particular stresses (academic, adjustment) which may increase their vulnerability to an eating disorder.

2.9 CONCLUSION

Although it has been known for some time that excessive exercise is one of the features of eating disorders, a review of the literature shows that it is only in more recent years that specific attempts have been made to explore the nature of the relationship between exercise dependence (compulsive exercising) and eating disturbance. Most of this research has

been with runners, and although Yates et al. (1983) proposed that compulsive exercising and eating disorders are analogous, most of the research with runners and other athletes fails to provide significant support for this relationship.

Models have been proposed which provide bases for exploring the relationship between exercise dependence and eating disorders. Numerous related questions are implicit in these models. Is the exercise dependence primary (independent of BN or AN), or is it secondary (a characteristic feature of AN or BN)? Can exercise dependence lead to the development of an eating disorder? Are exercise dependence and eating disorders merely superficially different presentations of essentially the same underlying disorder (they appear different but have essentially the same aetiologies)? On the other hand, are these two phenomena superficially similar but fundamentally different (both may present with excessive exercising and perfectionism, but have essentially different aetiologies)?

In an attempt to explore answers to such questions, research on eating disturbances in four different population groups has been reviewed: ballet dancers, competitive swimmers, music students, and undergraduate (psychology) students. The rationale for authors having chosen to compare different combinations of these four groups, is that they constitute varying levels and combinations of the three variables postulated in the literature as being contributors to eating disturbance: pressures to be thin (achieve an ideal, aesthetically pleasing body shape), pressures to exercise (fitness and strength), and competitiveness (high achievement expectations, both personal and external). In ballet schools there are pressures to be thin, to exercise, and they are

competitive; in competitive swimming there is no emphasis on thinness, but there are pressures to exercise and it is competitive; music colleges are presumed to be competitive, but without the pressures to be thin or exercise; undergraduate (psychology) students are generally used as controls, presumed to be comparatively lower on all three variables.

The overriding finding that appears to emerge from the literature, is that where there is an emphasis on thinness and body image (ballet, gym, figure-skating), there is an increased vulnerability to eating disturbance. In activities where there are pressures to exercise, but without an emphasis on thinness (swimming, running), there is usually no greater eating disturbance than in controls (nonathletes, general population). Competitiveness alone does not seem to increase vulnerabilty to eating disturbance, but in an environment where there are pressures to be thin, it can amplify the risk of developing eating difficulties.

Given the relatively short history of investigation into this area, past methodological inadequacies, and the need for greater clarification, it is suggested that further research is needed to evaluate the relationship between exercise dependence and eating disorders.

CHAPTER 3

METHODOLOGY

Discussion of the literature indicates that there is an association between exercise dependence (or, to use a synonym, compulsive exercising) and eating disturbance; people with eating disturbance often exercise excessively and addictively. However, it is the exact nature of this link that requires further research and clarification. Are people with greater eating difficulties more dependent on exercise? Do people who exercise excessively and indicate a greater degree of exercise dependence, necessarily have greater eating disturbance? These are the kinds of questions embedded in literature on this subject.

The aim of the present study is to explore further the nature of the link between eating disturbance and exercise dependence, and in so doing, attempt to answer the two questions posed above.

In order to achieve this, subjects were chosen from specific subcultures which the literature indicates have varying levels of, and combinations of, the following variables: pressures to be thin, pressures to exercise (with presumed associated increased dependency on exercise), and competitiveness Accordingly, ballet dancers, competitive swimmers, music students, and undergraduate psychology students, were chosen for participation. Ballet dancers are subject to pressures to be thin, to exercise, and competitiveness; in competitive swimming there is no emphasis on thinness, but there are pressures to exercise and it is competitive; music students

are presumed to be in a competitive setting, but with no emphasis on either thinness or exercise; finally, psychology students are presumed to be comparatively lower on all three variables.

Assuming that pressures to be thin, to exercise, and competitiveness, all equally contribute to the level of eating disturbance, one could hypothesize that ballet dancers should show the greatest level of eating disturbance (pressures to be thin, exercise, competitive), followed by the swimmers (pressures to exercise, competitive), then the music students (competitive). Finally, the psychology students should show the lowest level of eating disturbance (none of the three variables being comparatively prominent).

Using this methodology, certain hypotheses can be made regarding the link between degree of exercise dependence and eating disturbance. For example, if an emphasis on exercise leads to heightened vulnerability to an eating disorder, one would expect swimmers to demonstrate greater eating disturbance than both music and psychology students (neither of whom are subject to emphases on exercise). Furthermore, if it is the pressure to exercise, rather than pressure to be thin, that results in greater eating difficulties, one might expect there to be no significant difference in the level of eating disturbance between ballet dancers and swimmers (aside from the pressures to be thin, both groups are similar in that they are both subject to emphases on exercise and are both competitive). In sum, the design of this study enables one to gauge the relative contribution of exercise dependency to eating disturbance, in comparison to pressures for thinness, competitiveness, and various combinations of all three

factors.

3.1 SUBJECTS

A total of 150 female subjects participated. The swimmers were all White, but the ballet dancers, music students, and psychology students were each a mixture of White, "Coloured", and Indian. However, it can be argued that the subjects in this study, irrespective of race, generally come from similar middle-class backgrounds (the swimmers by virtue of the areas they live in, and the students by virtue of the fact that they can afford to go to university). Since the literature indicates strongly that people from similar socio-cultural and socioeconomic circumstances show similar eating attitudes and concerns, even though from different race groups, it was unlikely that there would be any significant differences between races regarding eating disturbances. Rosen et al. (1988) found no differences across race in adolescents on any factors directly pertaining to eating disorder symptoms. Dolan et al. (1990) reported that British Afro-Caribbean and British Asian women had similar concerns about body weight and shape to British Caucasian women.

As nearly all subjects supplied phone numbers, they were contacted if questionnaires were incomplete, thus maximising subject numbers.

1. Ballet Dancers (BDS) (N=32). Dancers were from the University of Cape Town (UCT) Ballet School and included females from first to third year. Permission was obtained from the head of the Ballet School, who gave class time in which questionnaires were completed. Not all female dancers were

present. There are 54 females in the ballet school, and of the 33 present, 32 returned their questionnaires. All respondents were weighed and measured. The age range was 18-21 (X=18.9; SD±0.87).

2. **Competitive Swimmers (SW)** (N=34). All swimmers who participated were competitive in that they participated in regular competitions. They were selected from some of the top clubs in the Western Province (W.P.) and 19 were members of the W.P. team. Questionnaires were distributed by coaches and most were then collected from the coaches, although some were returned by post. Of the 38 questionnaires distributed, 34 were returned. Ages ranged from 13-33 (X=16.6; SD±4.0).

Because of the large number of relatively young swimmers, the group was divided into two subgroups: younger swimmers (up to age 16) and older swimmers (17 and above). The older swimmers **(SWO)** would then be better matched for age with the other student groups, and differences due to inclusion of the younger swimmers **(SWY)**, could then be analysed. All swimmers **(SWA)** were also considered as a group for purposes of analysis.

3. **Music Students (MS)** (N=33). Music students were from the UCT College of Music and included females from all years of study. Permission from the head of the Music Department was obtained to include them in the study. A few minutes was granted at a concert which all students were meant to attend, to explain about the research and hand out questionnaires. Questionnaires were returned to a box in reception at the college. Of the 62 questionnaires handed out, 33 were returned. Ages ranged from 17-24 (X=20.1; SD±1.2).

4. Psychology Students (PS) (N=51). Subjects were all first year psychology students at UCT. The necessary permission to include them was obtained. Class time was granted and of 57 questionnaires handed out, 51 were returned. Ages ranged from 17-38 (X=18.9; SD±3.0).

3.2 INSTRUMENTS

All subjects completed each of the instruments below and were assured of confidentiality, safeguarded by the provision of envelopes where appropriate.

1. Demographic Questionnaire: Subjects all completed demographic details, including information on parents' present and past weights, menstruation, current height and weight, highest and lowest past weight, present and past dieting behaviour, and eating disorder history.

2. Eating Attitudes Test (EAT): (Garner & Garfinkel, 1979). This is a 40-item measure of eating disturbance covering areas such as dieting, bulimia and food preoccupation, self control regarding eating, and perceived pressure from others to gain weight. Total scores may range from 0-120. Responses are on a 6 point Likert scale with choices ranging from "Never" to "Always"; possible scores are 0, 0, 0, 1, 2, and 3, with 3 indicating the greatest disturbance. A score of 30 or above is used as a cut-off point to indicate subjects who have serious eating concerns and who may be at risk for, or indeed, have a clinical eating disorder. It is important to emphasise that a score of 30 or above does not necessarily indicate the presence of an eating disorder. Garner et al. (1982) demonstrated satisfactory reliability and validity for the

EAT.

3. Eating Disorder Inventory (EDI): (Garner et al., 1983). This is a 64 item, self-report multiscale measure designed to assess psychological and behavioural traits common in AN and BN. It consists of the following eight subscales:

1) Drive for Thinness (**DT**) - indicates excessive concern with dieting, preoccupation with weight and entrenchment in an extreme pursuit of thinness;
2) Bulimia (**BU**) - indicates the tendency toward episodes of uncontrollable overeating (bingeing) and may be followed by the impulse to engage in self-induced vomiting;
3) Maturity Fears (**MF**) - measures the wish to retreat to the security of the preadolescent years because of the overwhelming demands of adulthood;
4) Body Dissatisfaction (**BD**) - reflects the belief that specific parts of the body associated with shape change or increased "fatness" at puberty are too large (e.g. hips, thighs, buttocks);
5) Ineffectiveness (**IF**) - assesses feelings of general inadequacy, insecurity, worthlessness and the feeling of not being in control of one´s life;
6) Perfectionism (**PR**) - indicates excessive personal expectations for superior achievement;
7) Interpersonal Distrust (**ID**) - reflects a sense of alienation and a general reluctance to form close relationships;
8) Interoceptive Awareness (**IA**) - reflects lack of confidence in recognizing and accurately identifying emotions and sensations of hunger or satiety.

Scoring is based on a 6 point Likert scale, with responses ranging from "Never" to "Always". Respondents score 0, 0, 0, 1, 2, or 3, with 3 indicating the greatest disturbance. There is no total score for the EDI, but each subscale is scored. Although the manual does provide normative data, this study uses the subscale cut-off points of Futch et al. (1988), which were determined by subtracting one standard deviation from the means of reported scores for AN patients (Garner et al., 1983). This technique allows for the inclusion of 'false positives' - respondents potentially at risk who should be included in evaluations of vulnerable subjects. The cut-offs for the Bulimia and Body Dissatisfaction subscales used in the present study, are those reported by Garner et al. (1983); in this study the bulimic subgroup scored higher than the restrictive subgroup on these two scales. Garner et al. (1983) reported satisfactory reliability and validity for the EDI. DT, BU, and BD were considered the most relevant scales for this study because they deal directly with weight and dieting concerns. PR is also relevant, in that it is related to competitiveness.

4. Exercise Dependence Questionnaire (EDQ): (Ogden et al., 1993). This is a 29-item measure of exercise dependency, containing the following 8 subscales (see Appendix 1 for presentation of items in each subscale, which will clarify exactly what each subscale is attempting to tap):

1) Interference with family/social life;
2) Positive reward;
3) Withdrawal symptoms;
4) Weight control;
5) Insight;
6) Social reasons;

7) Health reasons;

8) Stereotyped behaviour.

The EDQ has a total score as well as scores for each subscale. Responses are indicated on a 7 point Likert scale, with 1 = "strongly disagree", and 7 = "strongly agree". A score of 7 indicates the most dependent behaviour. No cut-off point indicating severe dependency was given for the EDQ (probably because exercise dependence has not yet been established as a recognised diagnostic entity). The EDQ is better suited to this study than previous scales measuring compulsive exercising, because items do not reflect a bias in content toward any particular sport e.g. running (see EXERCISE AND EATING DISTURBANCE). Furthermore, the EDQ may also be used to investigate the relationship between exercise dependence and eating disturbance. The EDQ was, in fact, validated against the EAT and a significant correlation was found for the total score on all but two subscales (Ogden et al., 1983): higher EDQ scorers had higher EAT scores. The authors report satisfactory validity and internal reliability e.g. Cronbach's Alpha for EDQ Total = 0.84. EDQ Total score and Weight Control were considered most relevant to this study. The total gives an overall measure of exercise dependency, whilst Weight Control indicates whether subjects were exercising to control their weight.

5. Competitiveness Questionnaire (CQ): This questionnaire uses the Competitive Strategy Scale from the Cooperative/ Competitive Strategy Scale (Simmons et al., 1987). The reason for including the CQ rather than just using the Perfectionism subscale of the EDI, is that the CQ, unlike the Perfectionism scale, includes items specifically on interpersonal

competitiveness. Although Perfectionism measures striving for excellence (goal oriented, intrapersonal competitiveness), its items do not specifically include statements on interpersonal competitiveness (which one would expect in groups in this study). It was thus felt not to be as complete a measure of the construct of competitivess as the CQ.

The present study required a scale which could satisfactorily measure competitiveness in different population groups, and the one chosen seemed the most suitable of what was available. It appeared that previous scales measuring or related to competitiveness/ achievement expectations had been more specific, focussing on areas such as the workplace (Adams et al., 1985; Jenkins et al., 1979; Smith, 1973), the family (Adams et al., 1985), or sport (Cheatham & Rosentswieg, 1982). Another more general measure had a poor reliability (Griffin-Pierson, 1990).

Upon doing a factor analysis, Simmons et al. (1987), determined three key factors in the scale, one of which was "competitive strategies to achieve success". It is the 11 items in this factor which constitute the "Competitiveness Questionnaire" adapted for the present study. Retest reliability for this factor was 0.84 ($p<.001$), and construct validity was $r = .44$ ($p<.01$). Responses are on a 5 point Likert scale ranging from "never" to "always". Sujects score from 1-5 on each item, with 5 representing the highest degree of competitiveness. Total scores can range from 11-55. No cut-off point was established for the CQ.

3.3 STATISTICS

1) Descriptive statistics: means and standard deviations were calculated for both demographic data and scales.
2) A multiple correlation analysis was performed on data from all four groups to investigate whether there were significant correlations between variables.
3) A one-way analysis of variance (ANOVA) was conducted to evaluate whether there were any significant differences between the groups. Post-ANOVA tests were performed where there were differences to indicate between which groups these differences lay.
4) A regression analysis was performed on the whole sample of 150 as well as on each group to investigate the factors which best predicted EAT scores.
5) Results of subjects with high EAT scores were analysed.

CHAPTER 4

RESULTS

Demographic characteristics of the groups are presented first, followed by relevant results of the multiple correlation, one-way ANOVA, and stepwise regression. Finally, results are reported of subjects with EAT $\geq$ 30. Because these subjects are those at risk for an eating disorder, it would be useful to analyse their scores on variables relevant to the study (especially EDQ, Drive for Thinness, and CQ), in order to evaluate the association these factors have with eating disturbance in this high-risk group.

In keeping with the aim of the study, results from each mode of analysis are presented which reflect explanations as to the nature of the link between exercise dependence and eating disturbance, as well as how other variables (such as competitiveness and the pursuit of thinness) influence this relationship.

4.1 DEMOGRAPHIC INFORMATION FOR THE GROUPS

Demographic data (age, weight, height, BMI) are summarised in Table 1. The swimmers as a whole (SWA) and the younger swimmers (SWY) were significantly younger than all the other groups, but otherwise there were no significant differences in age between the groups; the older swimmers (SWO) were comparable in age to ballet dancers (BDS), music students (MS), and Psychology students (PS). Ballet dancers were significantly lighter than all groups except SWY, with SWO being significantly heavier than both SWY and PSY.

TABLE 1

DESCRIPTIVE CHARACTERISTICS OF THE FOUR GROUPS

	BDS (n=32)	SWA (n=34)	SWY (n=22)	SWO (n=12)	MS (n=33)	PS (n=51)
	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)
AGE	18.88 (0.87)	16.62 (4.01)	14.41 (0.73)	20.67 (4.42)	20.12 (1.17)	18.94 (3.04)
HEIGHT	1.62 (0.06)	1.68 (0.07)	1.66 (0.07)	1.71 (0.07)	1.64 (0.10)	1.63 (0.08)
WEIGHT	50.95 (5.47)	57.46 (6.90)	54.64 (4.59)	62.63 (7.59)	57.74 (6.61)	55.75 (6.70)
BMI	19.50 (2.09)	20.40 (1.72)	19.80 (1.22)	21.50 (2.00)	21.52 (3.40)	21.05 (2.47)

NOTE: BMI = Body Mass Index (Weight/ Height squared)

THE FOLLOWING SIGNIFICANT DIFFERENCES WERE FOUND ($p<0.05$):

AGE:	BDS > SWA	SWO > SWY
	MS > SWA	MS > SWY
	PS > SWA	PS > SWY
HEIGHT:	SWA > BDS	SWO > BDS
WEIGHT:	SWA > BDS	SWO > PS
	SWO > BDS	SWO > SWY
	MS > BDS	SWO > BDS
		MS > BDS
		PS > BDS
BMI:	MS > BDS	

Older swimmers were significantly taller than BDS. The only significant difference in BMI was that MS were significantly higher than BDS.

4.2 MULTIPLE CORRELATION ANALYSIS - ANALYSIS OF SCORES FOR EACH GROUP

A multiple correlation analysis was done to investigate relationships between variables in each of the four groups (BDS, SWA, MS, and PS). The correlation matrices are presented in Tables A - D in Appendix 2 and $p<0.05$ was used as the significance level in all the matrices. All significant correlations reported in this section are positive.

The Exercise Dependence Questionnaire Total score (EDQ) correlated significantly with the Eating Attitudes Test (EAT) in all four groups. A significant correlation was found between EDQ and Drive for Thinness in all groups except BDS. EDQ also correlated significantly with the Competitiveness Questionnaire (CQ) in SWA and PS; the correlation for SWA was strong (r = 0.73). EDQ correlated significantly with Body Dissatisfaction in all groups except BDS, with Bulimia in all groups except MS, and with BMI in MS only.

The EAT correlated very strongly with Drive for Thinness in all groups (all r >0.80), but did not correlate significantly with CQ in any of the groups.

The CQ correlated significantly with Perfectionism in all four groups, and with Weight Control in SWA and PS. CQ failed to correlate significantly with any scale that has a direct bearing on eating disturbance (EAT, Drive for Thinness,

Bulimia, Body Dissatisfaction), with the one exception of Bulimia in PS.

4.3 ONE-WAY ANALYSIS OF VARIANCE - INTERGROUP COMPARISON OF SCORES FOR ALL GROUPS

Means and standard deviations of scores on questionnaires for all groups (BDS, SWA, SWY, SWO, MS, and PS) are reported in Table 2. Means are depicted on bar graphs as follows:(EAT, Figure 1; EDQ, Figure 2;, CQ, Figure 3; Drive for Thinness, Bulimia, and Body Dissatisfaction, Figure 4). One-way ANOVA results analysing differences between these means are shown in Table 3. Significant differences are all calculated at $p<0.05$ level; all F values for the significant differences reported in this section can be found in Table 3. Note that this table has two parts: Table 3 (a) examines differences between BDS, MS, PS and swimmers as a whole (SWA), whilst Table 3 (b) evaluates differences between BDS, MS, PS and the swimmers split into young and old (SWY and SWO respectively). It was thought necessary to do this because the effect of age caused by having a large proportion of relatively younger swimmers needed to be considered. No significant differences were found between SWO and SWY on questionnaire results, but the reduced sample sizes because of the splits could be partly responsible for this.

The only significant difference in EAT scores was that BDS ($X=22.53$; $SD\pm14$) had a higher mean than SWA ($X=11.17$; $SD\pm6.82$) [$F = 4.17$; $p,0.0073$], but when dividing the swimmers into younger and older, the significant difference was only BDS > SWY ($X=9.77$; $SD\pm6.45$) [$F = 3.28$; $p<0.0131$].

TABLE 2

MEANS AND STANDARD DEVIATIONS FOR QUESTIONNAIRE RESULTS

VARIABLE (Cut-off point where available)	BDS (n=32) MEAN (SD)	SWA (n=34) MEAN (SD)	SWY (n=22) MEAN (SD)	SWO (n=12) MEAN (SD)	MS (n=33) MEAN (SD)	PS (n=51) MEAN (SD)
EAT (30.0)	22.53 (14.00)	11.17 (6.82)	9.77 (6.45)	13.75 (7.00)	19.18 (15.86)	16.20 (15.13)
EDQ TOTAL	116.25 (16.47)	113.88 (25.39)	108.64 (27.43)	123.50 (18.50)	91.88 (28.45)	99.51 (20.85)
WC	15.69 (5.26)	14.71 (5.35)	12.68 (5.02)	18.42 (3.80)	15.30 (7.09)	15.51 (4.97)
CQ	39.09 (6.22)	42.88 (6.68)	42.27 (7.71)	44.00 (4.29)	40.45 (6.74)	37.55 (5.84)
DT (10.0)	7.75 (5.81)	3.71 (4.62)	2.32 (3.30)	6.25 (5.69)	6.24 (6.88)	4.96 (7.11)
BU (4.0)	1.65 (1.95)	1.18 (2.42)	0.64 (1.36)	2.00 (3.57)	1.88 (3.18)	2.18 (3.83)
BD (7.0)	16.03 (6.98)	7.05 (6.31)	6.36 (6.86)	8.33 (5.19)	13.27 (9.51)	11.94 (7.85)
PR (5.0)	4.28 (3.95)	5.82 (4.07)	5.14 (4.13)	7.08 (3.80)	6.79 (4.68)	4.94 (4.14)

NOTES:

EAT = Eating Attitudes Test
EDQ TOTAL = Total score on the Exercise Dependence Questionnaire
WC = Weight Control subscale of the EDQ
CQ = Competitiveness Questionnaire
DT = Drive for Thinnness on EDI
BU = Bulimia on EDI
BD = Body Dissatisfaction on EDI
PR = Perfectionism on EDI

TABLE 3

ONE-WAY ANOVA'S: F VALUES AND SIGNIFICANT DIFFERENCES BETWEEN THE 4 GROUPS
(Two ANOVAs were done, one including SWA (3a); the other SWY and SWO (3b)

	3a ANOVA FOR GROUPS (BDS; SWA; MS; PS)		3b ANOVA FOR GROUPS (BDS; SWY; SWO; MS; PS)	
	F Value (pr>F)	SIGNIFICANT DIFFERENCES (p<0.05)	F Value (pr>F)	SIGNIFICANT DIFFERENCES (p<0.05)
EAT	4.17 (0.0073)	BDS > SWA	3.28 (0.0131)	BDS > SWY
EDQ TOTAL	8.77 (0.0001)	SWA > MS BDS > MS BDS > PS	7.50 (0.0001)	SWO > PS SWO > MS BDS > PS BDS > MS
WC	0.20 (0.8970)	NONE	2.27 (0.0650)	NONE
CQ	5.10 (0.0022)	SWA > PS	3.96 (0.0045)	SWO > PS
PR	2.27 (0.0834)	NONE	2.12 (0.0808)	NONE
DT	2.55 (0.0579)	NONE	2.71 (0.0326)	BDS > SWY
BU	0.84 (0.4725)	NONE	1.02 (0.3985)	NONE
BD	7.76 (0.0001)	BDS > SWA MS > SWA PS > SWA	5.93 (0.0002)	BDS > SWY MS > SWY

Figure 1

Comparison of EAT Mean Scores for All Groups

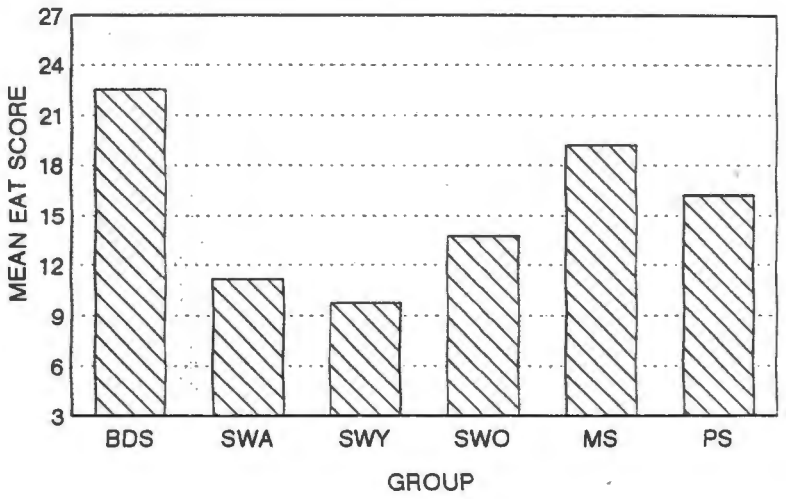


Figure 2

Comparison of EDQ Mean Scores for All Groups

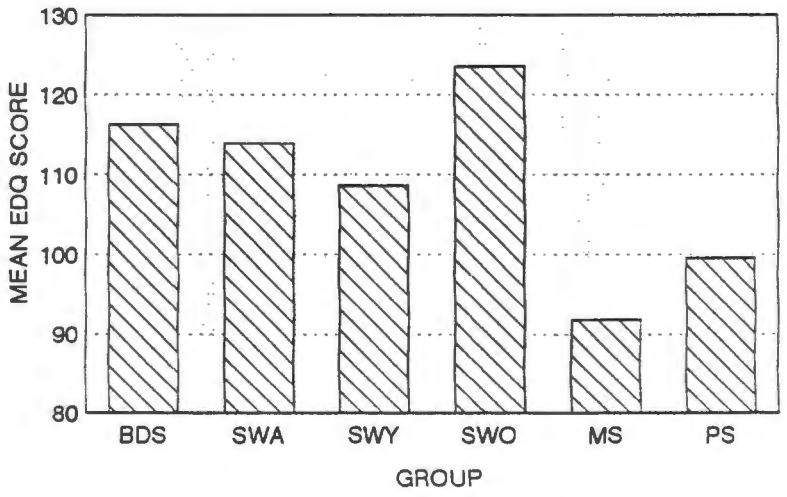


Figure 3

Comparison of CQ Mean Scores for All Groups

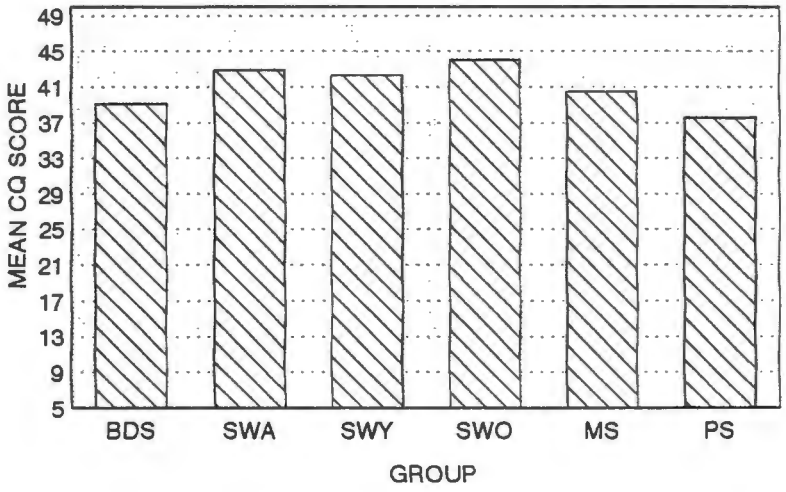
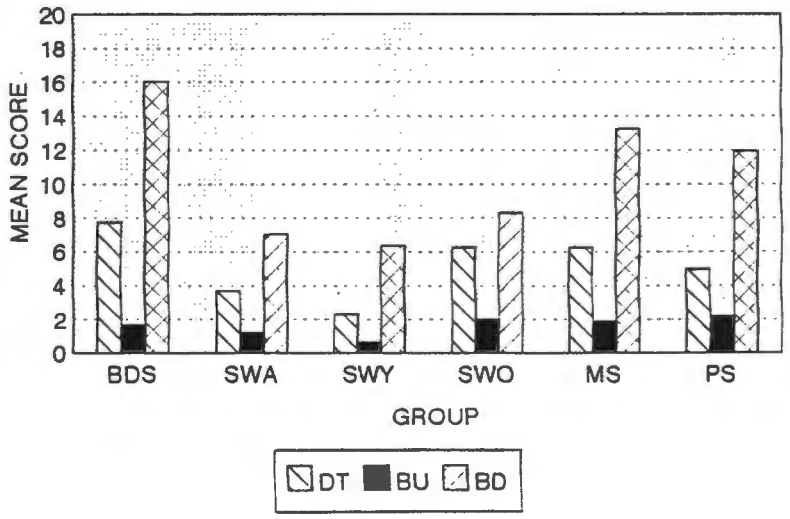


Figure 4

Comparison of DT,BU and BD Scores for All Groups



On the EDQ, BDS (X=116.25; SD±16.47) scored significantly higher than both MS (X=91.88; SD±28.45) and PS (X=99.51; SD±20.85), and SWA (X=113.88; SD±25.39) scored significantly higher than MS [F = 8.77; p<0.0001]. Once again, however, when looking at SWO and SWY separately, it was only SWO (X=123.5; SD±18.5) that were significantly higher than both PS and MS [F =7.5; p<0.0001], with SWY (X=108.64; SD±27.43) not being significantly higher than either .

No significant differences between groups were found on the Weight Control subscale of the EDQ or on Bulimia. The only significant difference on Drive for Thinness was BDS (X=7.75; SD±5.81) > SWY (X=2.32; SD±3.3) [F = 2.71; p<0.0326].

On the CQ, the only significant difference found was that the SWA group (X=42.88; SD±6.68) was higher than the PS group (X=37.55; SD±5.84) [F = 5.1; p<0.0022]. When looking at the two separate groups of swimmers, this was the case for SWO only (X=44; SD±4.29) [F = 3.96; p<0.0045], and not SWY (X=42.27; SD±7.71) . There were no significant differences on Perfectionism (which correlates strongly with CQ). On Perfectionism, means of all groups except BDS (X=4.28) and PS (X=4.94) were above the cut-off of 5.0, with the latter two groups being only slightly under the cut-off.

BDS (X=16.03; SD±6.98), MS (X=13.27; SD±9.51), and PS (X=11.94; SD±7.85) all had significantly higher Body Dissatisfaction than SWA (X=7.05; SD±6.31) [F = 7.76; p<0.0001]. However, splitting the swimmers into younger and older subgroups, it was found that the only significant differences were that BDS and MS both had higher Body Dissatisfaction than SWY (X=6.36; SD±6.86) [F = 5.93;

$p<0.0002$].

4.4 STEPWISE REGRESSION ANALYSIS - AN ANALYSIS OF WHICH FACTORS BEST PREDICT EATING DISTURBANCE

Stepwise regressions were performed on the whole sample, as well as BDS, SWA, MS, and PS, in order to determine the best predictors of EAT (the dependent variable). In each case the following predictors were entered: Drive for Thinness, EDQ Total, CQ (Competitiveness), Bulimia, Body Dissatisfaction, and Weight Control.

Drive for Thinness and Bulimia were the only variables selected as the significant predictors of EAT for the sample as a whole [F (2, 147) = 229.25; $p < 0.0001$]. The R-squared value showed that 75.7% of the variability in EAT could be explained by this model. Drive for Thinness was the strongest of these two predictors, explaining, by itself (i.e. before including other variables) 74% of the variance in EAT, whilst Bulimia, by itself, explained 44%. These percentages give an idea of the relative strength of the predictors in accounting for variance in EAT.

Drive for Thinness and EDQ were reported as significant predictors of EAT for BDS [F (2, 29 = 54.84; $p < 0.0001$]. R-square was 79%. These two variables, by themselves, explained the following amounts of variance in EAT: Drive for Thinness, 76.1%; and EDQ, 19.8%.

Drive for Thinness, Bulimia, and Body Dissatisfaction were the significant predictors of EAT scores for swimmers (SWA) [F (3, 30) = 30.00; $p < 0.0001$]. R-square was 75. Drive for Thinness

alone accounted for 66.9% of variance in EAT, Bulimia, 52.9%, and Body Dissatisfaction, 50%.

As with BDS, Drive for Thinness and EDQ were selected as the significant predictors of EAT for MS [F (2, 30) = 47.7; $p < 0.0001$]. R-square was 76.1. Drive for Thinness alone was responsible for 74% of variance in EAT, with EDQ accounting for 35.5%.

Lastly, Drive for Thinness, Bulimia, Weight Control, and Competitiveness were selected as significant in the final model for PS [F (4, 46) = 54.6; $p < 0.0001$]. R-square was 82.6. These predictors, by themselves, accounted for the following levels of variance in EAT: Drive for Thinness, 75.3%; Bulimia, 60.6%; Weight Control, 42.9%; Competitiveness, 1.6%.

4.5 SUBJECTS WITH HIGH EAT SCORES - "POSSIBLE CASES OF EATING DISORDERS"

Table 4 shows the percentages of subjects in each group with EAT $\geq$ 30. There were 25% of BDS in this category, 18.18% of MS, and 17.65% of PS. No swimmers, younger or older, had scores at or above 30. It was felt that the inclusion of "borderline" scores (25-29) in Table 4 would, perhaps, more accurately reflect the proportions of those with disturbed eating patterns in each group. For example, 40% of BDS had EAT $\geq$ 25, as opposed to 27% of MS and 25% of PS. The ratio of BDS to the other groups thus increased using this lower "borderline" cut-off. Despite the lower cut-off, only 5.8% of swimmers scored at EAT $\geq$ 25.

TABLE 4

PROPORTIONS OF SUBJECTS WITH EAT≥30 AND EAT≥25

	ALL SUBJECTS (n=150)	BDS (n=32)	SWA (n=34)	SWY (n=22)	SWO (n=12)	MS (n=33)	PS (n=51)
EAT≥30	15.33% (n=23)	25.00% (n=8)	0.00% (n=0)	0.00% (n=0)	0.00% (n=0)	18.18% (n=6)	17.65% (n=9)
EAT≥25	24.67% (n=37)	40.63% (n=13)	5.88% (n=2)	4.55% (n=1)	8.33% (n=1)	27.27% (n=9)	25.49% (n=13)

TABLE 5

MEANS, STANDARD DEVIATIONS AND ANOVA COMPARING SUBJECTS WITH EAT ≥ 30 vs THOSE WITH EAT < 30

	CUT-OFFS (if available)	EAT ≥ 30 (n=23) MEAN (SD)	EAT < 30 (n=127) MEAN (SD)	F Value (Pr>F)
EDQ		121.65 (17.37)	101.58 (24.68)	13.92 (0.0003)
DT	10.0	16.04 (3.23)	3.65 (4.78)	142.18 (0.0001)
CQ		40.22 (5.90)	39.64 (6.71)	0.15 (0.6987)
PR	5.0	6.78 (5.10)	5.16 (4.07)	2.86 (0.0926)
WC		21.65 (3.59)	14.17 (5.11)	45.09 (0.0001)
BU	4.0	5.57 (4.20)	1.07 (2.20)	58.33 (0.0001)
BD	7.0	20.83 (5.28)	10.40 (7.70)	38.73 (0.0001)
BMI	20-25 = normal	20.86 (2.33)	20.64 (2.62)	0.15 (0.6966)

NOTES:

EAT = Eating Attitudes Test
EDQ = Total score on the Exercise Dependence Questionnaire
WC = Weight Control subscale of the EDQ
CQ = Competitiveness Questionnaire
DT = Drive for Thinnness on EDI
BU = Bulimia on EDI
BD = Body Dissatisfaction on EDI
PR = Perfectionism on EDI

Table 5 compares the mean scores of those subjects with EAT $\geq$ 30 with those scoring EAT < 30. Significant differences between these two groups were found on all variables related directly to eating disturbance (Drive for Thinness, Bulimia, and Body Dissatisfaction), as well as on EDQ.

There were no significant differences between the two groups on CQ, Perfectionism, and BMI. On Drive for Thinness, subjects with EAT $\geq$ 30 scored 6 points above the cut-off (X=16.04; SD$\pm$3.23), as compared to those with EAT < 30 (X=3.65; SD$\pm$4.78) who scored well below the cut-off [F = 142.18; $p<0.0001$]. EAT $\geq$ 30 subjects also scored 20 points higher on EDQ (X=121.65; SD$\pm$17.37) than those with EAT < 30 (X=101.58; SD$\pm$24.68) [F = 13.92; $p<0.0003$].

CHAPTER 5

DISCUSSION

This study has attempted to explore the link between exercise dependence and eating disturbance in females. In order to do so it has focussed on samples from four population groups, each having varying levels of, and combinations of, the following variables: pressures to exercise (where one might expect increased exercise dependency), pressures to be thin, and competitiveness. The aim was to investigate the relative contribution of exercise dependency to eating disturbance, compared to the contributions of pressures for thinness, competitiveness, and various combinations of these variables. This chapter discusses these issues by considering the links between each of these variables and eating disturbance in terms of the profiles shown by the different groups.

5.1 EXERCISE DEPENDENCE AND EATING DISTURBANCE

Exercise dependence appears from the literature to be one of many related terms describing the phenomenon of compulsive or addictive exercising, but it is not, as yet, a recognised diagnostic entity (Ogden et al., 1993). A diagnosis of exercise dependence cannot, therefore, be obtained using the EDQ and, similarly, there is no cut-off point on this scale indicating exercise dependence. Accordingly, use of the term exercise dependence in connection with any group in this discussion does not indicate a diagnosis, but refers to the level of dependence as measured on the EDQ.

Subsequent to Yates et al. (1983) suggesting that 'obligatory running' is an analogue of AN, most studies researching the relationship between compulsive exercising and eating disturbance in female athletes, have found that those who exercise excessively or compulsively do not necessarily have disturbed eating patterns (Hauck & Blumenthal, 1992; Nash, 1987; Weight & Noakes, 1987; Yates et al., 1994). The present study indicates that there is a relationship between exercise dependence and eating disturbance. However, it supports the majority of research in the literature in finding that a higher degree of exercise dependence does not necessarily lead to greater eating disturbance.

In the present study, results suggest a definite relationship between exercise dependence and disturbed eating, in that there were positive correlations between the EDQ and the EAT in all four groups. This is consistent with the finding of Ogden et al. (1993) who used the same two instruments. The significantly higher EDQ scores of subjects with EAT $\geq$ 30 compared with those of EAT < 30, further supports the suggestion of such a relationship. This correlation begs the question central to the literature: what is the direction of this relationship? Is exercise dependence primary (and independent of eating disturbance) or is it secondary (a characteristic feature of eating disturbance)? As is discussed below, results in this paper indicate that it is secondary.

This indication comes primarily from comparing results of swimmers with all the other groups. In sum, swimmers indicated comparatively high levels of exercise dependence, but comparatively low levels of eating disturbance, suggesting that exercise dependence does not necessarily lead to eating

difficulties, especially in the absence of pressures to be thin.

A comparison of the results of ballet dancers and swimmers illustrates this point. The only significant difference in EAT scores was found between BDS and SWY. Furthermore, these two groups had no significant differences in either EDQ or CQ scores. This indicates that levels of exercise dependence and competitiveness do not appear to explain the lower eating disturbance of the younger swimmers. Developmental factors related to weight and dieting concerns will be discussed in the next section, as it is these factors which are likely to explain, in part, the relatively low EAT scores of younger swimmers. However, even though there was no significant difference in EAT between BDS and other groups besides SWY, the older swimmers, comparable in age to the ballet dancers, still scored much lower on the EAT than BDS. Additionally, SWO scored higher than BDS (albeit not significantly) on both exercise dependency and competitiveness. Once again, this demonstrates that those with greater exercise dependency scores will not necessarily show higher eating disturbance. Competitiveness in the ballet school cannot be invoked to explain the higher EAT scores of BDS, because SWO appeared to be more competitive than BDS. No studies were found comparing ballet dancers and swimmers on the EAT and EDQ, making direct comparisons impossible.

The comparison between ballet dancers and swimmers and its indications for the link between exercise dependence and eating disturbance, can be considered from another perspective. Ballet dancers were included in the study because, in addition to pressures to exercise and high levels

of competitiveness, they are also subjected to pressures to be thin (Garner & Garfinkel, 1980). Swimmers were selected because they had pressures to exercise, and were competitive, but were not subject to an emphasis on thinness (Borgen & Corbin, 1987). If, as hypothesised in Chapter 3, it was exercise dependence rather than pressures for thinness that determined degree of eating disturbance, it could be expected that there would be no difference in the EAT scores of the ballet dancers and swimmers (BDS and SWA were matched for pressures to exercise and competitiveness, and differed only on emphasis on thinness). There was a difference in EAT, however, with swimmers scoring markedly lower than ballet dancers, confirming that emphasis on thinness is an important determinant of disturbed eating (Borgen & Corbin, 1987; Garner & Garfinkel, 1980; Yates et al., 1994). This will be discussed in more detail in the following section.

The fact that SWO scored highest on Weight Control (even though not significantly), but at the same time lower on EAT than BDS, MS, or PS, suggests that swimmers are using exercise as a means of weight control with the primary motive of improving their performance rather than for a pursuit of thinness in itself, as would, for example, exercising anorexics (De Coverley Veale, 1987).

Comparing swimmers with the music and psychology students, provides further evidence suggesting that higher levels of exercise dependence do not necessarily lead to greater eating disturbance. Despite the older swimmers (who were matched for age with MS and PS) scoring significantly higher than both student groups on EDQ, they show a trend toward lower scores on the EAT, albeit not significantly.

Brooks-Gunn, Burrow & Warren (1988) compared ballet dancers and swimmers (along with other groups) regarding attitudes to eating and body weight. They found that the dancers had more negative attitudes towards eating and showed more eating restraint. They proposed that one reason for this could be that lower weights are more difficult to maintain in ballet because dancers expend less than half the energy of swimmers in a typical training session/class (Cohen et al., 1982; McArdle, Katch, & Katch, 1986, in Brooks-Gunn, Burrow, & Warren, 1988). Anecdotal information obtained from swimming coaches during the course of the research indicates that some swimming coaches feel that swimmers very seldom develop eating disorders whilst competing, because the training (and energy expenditure) controls their weight. However, the coaches add that they have found that once swimmers stop training, some have developed eating disorders. This, in the coaches opinion, is because the ex-swimmers are no longer burning up the calories they did whilst training and need to find alternative methods of weight-control.

The stepwise regression indicates that level of exercise dependence is a relatively weak predictor of eating disturbance, when compared with factors related directly to weight and dieting concerns (such as Drive for Thinness and Bulimia). EDQ was found not to be a significant predictor for eating disturbance when the total sample was analysed, and was significant only in the BDS and MS samples, indicating its inconsistency as a significant predictor of eating disturbance.

By way of summing up this section, it could be asked to what extent eating disturbance (EAT scores) could be predicted from

levels of exercise dependence (scores on the EDQ), and vice versa. The results of this study indicate that it is far more likely that a subject with a high EAT score will also have a high EDQ score, than that somebody with a high EDQ score will have a high EAT score. It would seem that an eating disturbance is far more likely to lead to increased exercise dependency than exercise dependence is to lead to increased eating disturbance. In other words, the data suggests, along with most studies reviewed (e.g. Hauck & Blumenthal, 1992; Ogden et al., 1993; Yates et al., 1994) that exercise dependence is either secondary to eating disturbance or is an independent phenomenon; this is consistent with Model I outlined in Chapter 2 (Eisler & Le Grange, 1990).

5.2 PRESSURES TO BE THIN AND EATING DISTURBANCE

Numerous researchers have noted that increased pressures for thinness lead to higher levels of eating disturbance (Borgen & Corbin, 1987; Bruch, 1973; Garner & Garfinkel, 1980). In Western society there are pervasive sociocultural expectations of thinness for women in the general population (Wiseman et al., 1992). This emphasis on thinness is even greater in certain groups such as ballet dancers and gymnasts, who have to maintain an optimal body weight and appearance; they are thus at a higher risk for developing eating disorders (Garner & Garfinkel, 1980; Gordon, 1990).

Ballet dancers were included in the present study because they are, unlike swimmers, subject to these pressures for thinness. This enabled comparisons between these two groups regarding the impact of pressures to be thin on levels of eating disturbance.

Strong positive correlations were found between EAT and Drive for Thinness in all groups, indicating a definite relationship between pressures for thinness and eating disturbance. These correlations, all greater than 0.80, are consistent with the finding of Raciti & Norcross (1987) of a 90% correlation between the EAT and Drive for Thinness in undergraduate students.

The results on the one-way ANOVA also indicate strongly that pressures for thinness are an important determinant of eating disturbance. The only significant difference in EAT was between BDS and SWY; furthermore, the only significant difference in Drive for Thinness scores was between these same two groups. As there were no differences between BDS and SWY on either exercise dependence (EDQ) or competitiveness (CQ), it appears that it was pressure for thinness that explained the difference in eating disturbance between these two groups. The difference in pressure for thinness between BDS and SWY is likely to have been due to more than just their respective activities, however, given that young adolescent females have less difficulty with body weight and shape than older adolescents and young adults (Whitaker et al., 1989). The younger swimmers were about 14 years of age, 4 years younger than the ballet dancers. Additionally, SWY had significantly lower Body Dissatisfaction than BDS, and were the only one of the five groups to be below the cut-off on this factor. This is probably also due to age-related developmental reasons, and a further reason why SWY have the lowest EAT scores.

Added evidence of the importance of pressures for thinness in leading to eating difficulties, is that in a group known to have an emphasis on thinness (BDS), 25% of subjects fell in

the high-risk category for eating disorders, whereas the swimmers, who are not subjected to pressures for thinness, had no subjects in this category, either older or younger. This was the case even though all swimmers (younger and older) showed similar levels of exercise dependence and competitiveness to the ballet dancers.

As indicated earlier, the fact that the only significant difference in EAT scores was found between the ballet dancers and young swimmers, and that the only significant difference in Drive for Thinness was found between the same two groups, indicates the importance of pressures for thinness in determining eating disturbance. However, conversely, this result also suggests that where there are no differences in Drive for Thinness, the chances of finding differences in eating disturbance are significantly lowered. In the current study, where there were no significant differences between groups on Drive for Thinness, there were consistently also no significant differences in EAT scores.

There were no significant differences between the groups on Bulimia, with the only significant differences on Body Dissatisfaction being that SWY were lower than both BDS and MS. These results show the relative importance of factors directly related to weight and dieting concerns (WDC) viz. Drive for Thinness, Bulimia, and Body Dissatisfaction, in determining level of eating disturbance. In general, where there were no significant differences between the groups on WDC factors, there were also no significant differences in EAT scores. Conversely, it was only where there was a significant difference in WDC factors, that there was a significant difference in EAT scores. Welch et al. (1988) identified these

WDC factors when they found that for a non-patient population, Drive for Thinness, Bulimia, and Body Dissatisfaction collapsed into one more general subscale tapping concerns with shape, weight, and eating.

Undergraduate female students as a whole appear to present with fairly similar levels of WDC, as indicated by the results showing no significant differences between BDS, MS, and PS, on EAT, Drive for Thinness, Bulimia, and Body Dissatisfaction. Though significant differences on these scales may have been reached had the sample sizes been larger, the trend is nevertheless noteworthy, and appears to reflect the high degree of body dissatisfaction among female college women (Klemchuk et al., 1990), as well as the significantly higher incidence of eating disorders among female students compared with working women (Hart & Ollendick, 1985).

No significant differences were found between the three student groups on EAT and WDC factors. However, the different percentages of subjects with high eating disturbance in each group, indicates the important influence of pressure for thinness on eating disturbance. BDS (presumed to have the highest emphasis on thinness) clearly presented with the highest percentage of subjects with high EAT scores (EAT $\geq$ 30). This finding is consistent with other research which compared eating disturbance in ballet dancers with that in groups in which there is no emphasis on thinness (Garner & Garfinkel, 1980). Using the lower cut-off of EAT $\geq$ 25 ("borderline" high-risk category), the ratio of BDS to the other groups in this category, was even more marked.

The stepwise regression clearly shows that Drive for Thinness

is the best predictor of level of eating disturbance, as reflected by EAT scores. It was selected as a significant predictor in all groups, and, by itself, accounted for the most variance in EAT in each group. Apart from Drive for Thinness, another factor directly related to concerns with weight and dieting, Bulimia, was the only other variable selected as a significant predictor in the model for the total sample.

In sum, results indicate that Drive for Thinness in particular, along with other WDC factors (Bulimia and Body Dissatisfaction), appear to be the variables that account most for levels of eating disturbance. Levels of eating disturbance appear to rise and fall mainly as a function of the degree of pressure for thinness in a particular group, as well as the levels of concern with body weight and shape. On the other hand, the previous section showed that level of exercise dependence did not have nearly as strong an influence on level of eating disturbance. Groups with comparably high levels of exercise dependence, such as the swimmers, had relatively low levels of eating disturbance.

5.3 COMPETITIVENESS AND EATING DISTURBANCE

Researchers have investigated the relationship between competitiveness and eating disturbance in various settings: career (Selvini-Palazzoli, 1974), academic (Hamburg & Herzog, 1985), and among female competitive athletes (Yates et al., 1994). The overriding finding in the literature reviewed is that competitiveness alone does not lead to significantly increased eating disturbance. However, in environments where there is an augmented emphasis on thinness, competitiveness

appears to exacerbate eating difficulties. Garner and Garfinkel (1980) noted that there were greater levels of eating disturbance in ballet schools that were more competitive.

Using the same rationale as Garner and Garfinkel (1980), music students were included in the present study to see whether competitiveness alone led to higher levels of eating disturbance. Music students were selected because they were presumed to come from a setting equally competitive to that of a ballet school, but without the emphasis on thinness, or, in the present study, the increased pressure to exercise. Furthermore, it was attempted to remedy two methodological limitations in the Garner and Garfinkel (1980) study. Firstly, BDS and MS in the present study are at a more appropriate age for optimal expression of eating disturbances, whereas those in the Garner and Garfinkel (1980) study were, being at a mean age of 15 years, younger than this optimum. In addition, it was presumed by Garner and Garfinkel (1980) that the music and ballet students came from comparably competitive settings, but levels of competitiveness were not directly measured. The present study includes a competitiveness scale (CQ).

If it was competitiveness alone that was responsible for levels of eating disturbance, rather than other factors (e.g. exercise dependence levels, pressures for thinness, concerns about weight and dieting), then, in the current study, as in that by Garner and Garfinkel (1980), one would expect BDS and MS (assumed to be equally competitive) to show similar measures of eating disturbance.

Results in the current study indicated that BDS and MS were

comparably competitive. They did not, however, show significant differences in EAT scores. This was different to the finding in Garner & Garfinkel's study, where ballet dancers showed markedly higher levels of eating disturbance than the music students. Therefore, unlike Garner and Garfinkel (1980), who were able to draw the tentative conclusion that competitiveness alone does not lead to eating disturbances, on the basis of the comparison of BDS and MS in the present study, it was not possible to draw conclusions as to whether this was the case or not. In the Garner and Garfinkel (1980) research, music students had mean EAT scores of 13.7 compared with 25.9 for the ballet dancers. In the present study, MS scored 19.18 on the EAT, compared with a BDS mean of 22.53. The major reason for this lack of a significant difference in EAT may be that the ballet and music students in the present study were older than those in the study by Garner and Garfinkel (1980) and, consequently, at a developmental age where weight and dieting concerns come to affect women more equally than in young adolescents, irrespective of their particular activities. In other words, it may be tentatively suggested that ballet dancers at age 15 might be a higher risk group than music students of the same age, but when looking at 18-year-old students, the difference in risk for eating disturbance between ballet and music students may be narrowed because of the developmental factors mentioned above.

It was also hypothesised that MS would be significantly more competitive than PS, but otherwise the two groups would be similar because there are presumably no emphases on thinness or exercise in either group. If MS had significantly higher CQ and EAT scores than PS, but were otherwise similar, one could have speculated that it was the higher level of

competitiveness of MS that was responsible for their higher eating disturbance. But, as was the case with BDS and MS, the MS and PS appeared to have comparable levels of both eating disturbance (as reflected in the EAT scores) and competitiveness (as reflected on the CQ). Because MS appeared to be no more competitive than PS, contrary to what was hypothesised, the comparison of these two groups, once again, did not enable a conclusion to be drawn as to whether competitiveness alone was responsible for eating disturbance.

However, in line with studies reviewed in the literature comparing competitive female athletes with non-athletes (Hauck & Blumenthal, 1992; Weight & Noakes, 1987), and those in competitive academic settings (medical students) with those in less competitive academic settings (Futch et al., 1988; Hamburg & herzog, 1985), other results in the present study which are discussed below, did indicate convincingly that competitiveness alone does not lead to increased eating disturbance, and that, in general, it seems to be a relatively weak contributor to difficulties with eating.

In all groups, with one exception, competitiveness (CQ) failed to correlate significantly with any scales directly related to eating disturbance (EAT, Drive for Thinness, Bulimia, and Body Dissatisfaction). The only exception was a significant correlation between CQ and Bulimia in PS. This suggests that level of competitiveness has little influence on degree of eating disturbance.

On the ANOVA, the only significant difference in competitiveness was that SWO were more competitive than PS, as reflected in their CQ scores. However, the EAT score of SWO

was lower than that for PS, albeit not significantly. This once again indicates the relative unimportance of competitiveness in determining eating disturbance. Not only were SWO significantly higher than PS on competitiveness, but they were also significantly higher on exercise dependence (EDQ). This demonstrates that, even when a group is both more competitive and more exercise dependent than another, it can still present with lower levels of eating disturbance, because there is no emphasis on thinness.

Consistent with the above results, is the lack of a notable difference in competitiveness between participants in the high-risk category for eating disorders (EAT$\geq$30) and those with lower levels of eating disturbance (EAT<30). This corresponds with the report by Yates et al. (1994), that while anorexics and compulsive athletes may both show high levels of perfectionism (a construct closely related to competitiveness), the runners do not show the same high levels of eating disturbance.

Finally, the stepwise regression indicated competitiveness (CQ) to be a non-significant predictor of EAT in all but one group - PS. Even in this group, however, competitiveness appeared to account only minimally for levels of eating disturbance.

To sum up this section, results suggest that competitiveness alone is not responsible for eating disturbance and, in general, the two are weakly related. However, competitiveness may exacerbate eating difficulties in settings with augmented emphases on thinness (Garner & Garfinkel, 1980), something which the present study did not directly investigate.

5.4 CONCLUSION

The aim of the present study was to investigate the link between exercise dependence and eating disturbance and to compare this link with those between pressures for thinness and eating disturbance, as well as competitiveness and eating disturbance. Most of the literature reviewed on the subject suggests that exercise dependence is either a phenomenon independent of eating disturbance, or it is secondary to eating disturbance (a characteristic feature of an eating disturbance). Pressures for thinness and concerns about weight and dieting appear to be important determinants of eating difficulties, but competitiveness, on the other hand, seems to have a comparably less convincing link with eating disturbance.

By selecting groups presumed to represent different levels and combinations of pressures for thinness, exercise dependence, and competitiveness, the present study attempted to investigate systematically the relative significance of each of these variables in determining levels of eating disturbance, with the major focus being on exercise dependence and eating disturbance.

Results confirmed the majority findings in the literature reviewed regarding the relationship between each of these variables and eating disturbance. Results showed that high levels of exercise dependence did not necessarily lead to high levels of eating disturbance and, in fact, some groups with high exercise dependence scores showed the lowest levels of eating disturbance. Additionally, results sugessted that an eating disturbance is far more likely to lead to increased

exercise dependency than exercise dependence is to lead to increased eating disturbance.

The factors most responsible for eating difficulties were those associated with pressures for thinness and, more generally, weight and dieting concerns (the scales measuring Drive for Thinness, Bulimia, and Body Dissatisfaction). Results demonstrated competitiveness to be a relatively insignificant determinant of eating disturbance.

There were possible methodological limitations to the study. Although sample sizes were acceptable for this kind of investigation, they were nevertheless not large. This may have contributed to the reduced statistical power and consequent lack of significant differences on certain variables (e.g. EAT). Also, because the return rate of questionnaires by music students was 53%, generalising results to the general population of female music students should be done with caution. Furthermore, only 61% of ballet dancers completed questionnaires. The other 39% were apparently unable to attend the period granted for questionnaire completion because of other commitments. The possibility of a biased sample cannot be excluded and, as with the music students, similar caution should be applied with the dancers regarding generalizing results to ballet students outside of the obtained sample.

A further factor which limited the scope of the study was that exercise dependence is not yet a recognised diagnostic entity and accordingly, there was no cut-off on the EDQ. This meant that no conclusions could be drawn about people with 'clinical exercise dependence'. Finally, evaluation of the comparative influence of other variables on eating disturbance (such as

other subscales on the EDI and EDQ which were not considered) was beyond the scope of this study.

These omissions could provide but a few of the many areas which, as asserted by Ogden et al. (1993), need further exploration in considering the link between exercise dependence and eating disturbance.

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APPENDIX 1

INSTRUMENTS

UNIVERSITY OF CAPE TOWN

Department of Psychology

University of Cape Town · Rondebosch 7700 · South Africa
Telephone: (021) 650-9111
Fax No: (021) 650-3726

Dear participants

Thank you very much for taking part in this study.

I am an intern clinical psychologist at the University of Cape Town and am doing research in the area of eating attitudes and behaviour.

All information received from you will be treated with the utmost confidentiality. In completing the questionnaires, please ensure that you complete both sides of the page, where applicable.

For those of you who are returning questionnaires by post, there are stamped envelopes provided. I would be very grateful if you could do this within a few days, so that I can begin analyzing the information.

Thank you again for your time and co-operation.

ANGUS MCDONALD

Please would all swimmers complete this section by **CIRCLING** or **FILLING IN** the appropriate response:

1. Are you a member of the Western Province Schools Swimming Team?

YES NO

2. Are you a member of the Western Province Swimming Team?

YES NO

(Note: If you are a member of BOTH the Western Province Schools Swimming Team AND the Western Province Swimming Team, then circle YES for both questions 1 and 2).

3. On average, how many days per week do you train?

.....

4. On average, how many times per day do you train?

.....

5. On average, how many hours are each of your training sessions?

.....

6. Do you swim in competitions? YES NO

7. On average, how many competitions do you swim in per month?

.....

NB: IN THE QUESTIONNAIRES TO FOLLOW, PLEASE REMEMBER TO ANSWER **ALL QUESTIONS**, EVEN IF YOU FEEL SOME MAY NOT BE THAT APPLICABLE TO YOU.

Please would all ballet students complete this section by **CIRCLING** the applicable response:

What course are you currently registered for?

A) PERFORMERS CERTIFICATE IN DANCE

B) DIPLOMA IN BALLET

C) OTHER (PLEASE SPECIFY) .....

Which year in your certificate or diploma are you registered for?

A) IST YEAR

B) 2ND YEAR

C) 3RD YEAR

D) OTHER (PLEASE SPECIFY) .....

NB: IN THE QUESTIONNAIRES TO FOLLOW, PLEASE REMEMBER TO ANSWER **ALL QUESTIONS**, EVEN IF YOU FEEL SOME MAY NOT BE THAT APPLICABLE TO YOU.

Please would all music students complete this section by CIRCLING the applicable response:

1. Which course are you registered for?

   A) CLASSICAL B.MUS

   B) CLASSICAL PERFORMERS DIPLOMA

   C) JAZZ B.MUS

   D) JAZZ PERFORMERS DIPLOMA

   E) OTHER (PLEASE SPECIFY) .....

2. Which year of your degree or diploma are you currently registered for?

   A) 1ST YEAR

   B) 2ND YEAR

   C) 3RD YEAR

   D) 4TH YEAR

   E) OTHER (PLEASE SPECIFY)
   .....

NB: IN THE QUESTIONNAIRES TO FOLLOW, PLEASE REMEMBER TO ANSWER **ALL QUESTIONS**, EVEN IF YOU FEEL SOME MAY NOT BE THAT APPLICABLE TO YOU.

DEMOGRAPHIC

Please complete this form as honestly and as accurately as possible.
All information provided will remain strictly confidential.

Date.....

Name.....

Age..... Year of study.....

Present Address.....

..... Tel No.....

Have you always lived in Cape Town? .....
If not, where did you live? .....
Are you living in a residence?.....

1. Are either of your parents overweight?.....
   Who?.....
   Have they always been overweight?.....

2. Are you a vegetarian?.....
   Do you eat eggs and cheese?.....
   How may eggs per week?.....
   How much cheese per week?.....

3. Do you have an history of an eating disorder?.....
   If yes, was it diagnosed or not?.....
   Nature of disorder.....
   Duration of disorder.....
   At what age did disorder begin?.....

4. Do you menstruate?.....
   When was your last period?.....
   How often do you menstruate?.....
   When did you first start menstruating?.....

5. Height:.....

6. Weight:.....

7. Do you ever feel faint, dizzy, lack energy?.....
   State which and how often.....

8. Do you ever take diuretics (`water pills´)?.....
   How often?..... How many?.....
   Do you ever vomit?..... How often?.....
   Do you ever take laxatives?.....
   How often?..... How many?.....

9. Do you take supplements or vitamins?.....
If so, name them and quantity/amount taken per day.....
.....

10. Do you consume alcohol?.....
If so, what type.....
How much on weekdays:.....
weekends:.....

11. Highest Previous Adult Weight.....
Age at that time.....

12. Lowest Previous Adult Weight.....
Age at that time.....

13. Are you satisfied with your present weight (yes/no)?.....

14. If no, what weight would you like to be?.....

15. Were you ever overweight as a child or adolescent?.....

16. If yes, did you diet at that time?.....
Please give brief details.....
.....
.....

17. Are you currently on a weight-reducing diet?.....
If yes, please describe the diet briefly.....
.....
.....
.....
.....

EAT

NAME: ..... Date: .....

Please place an (X) under the column which applies best to each of the numbered statements. All of the results will be strictly confidential. Most of the questions directly relate to food or eating, although other types of questions have been included. Please answer each question carefully. Thank you.

ALWAYS	VERY OFTEN	OFTEN	SOMETIMES	RARELY	NEVER	
( )	( )	( )	( )	( )	( )	1. Like eating with other people.
( )	( )	( )	( )	( )	( )	2. Prepare foods for others but do not eat what I cook.
( )	( )	( )	( )	( )	( )	3. Become anxious prior to eating.
( )	( )	( )	( )	( )	( )	4. Am terrified about being overweight.
( )	( )	( )	( )	( )	( )	5. Avoid eating when I am hungry.
( )	( )	( )	( )	( )	( )	6. Find myself preoccupied with food.
( )	( )	( )	( )	( )	( )	7. Have gone on eating binges where I feel that I may not be able to stop.
( )	( )	( )	( )	( )	( )	8. Cut my food into small pieces.
( )	( )	( )	( )	( )	( )	9. Aware of the calorie content of foods that I eat
( )	( )	( )	( )	( )	( )	10. Particularly avoid foods with a high carbohydra content (e.g. bread, potatoes, rice, etc.)
( )	( )	( )	( )	( )	( )	11. Feel bloated after meals.
( )	( )	( )	( )	( )	( )	12. Feel that others would prefer if I ate more.
( )	( )	( )	( )	( )	( )	13. Vomit after I have eaten.
( )	( )	( )	( )	( )	( )	14. Feel extremely guilty after eating.
( )	( )	( )	( )	( )	( )	15. Am preoccupied with a desire to be thinner.
( )	( )	( )	( )	( )	( )	16. Exercise strenuously to burn off calories.
( )	( )	( )	( )	( )	( )	17. Weigh myself several times a day.
( )	( )	( )	( )	( )	( )	18. Like my clothes to fit tightly.
( )	( )	( )	( )	( )	( )	19. Enjoy eating meat.
( )	( )	( )	( )	( )	( )	20. Wake up early in the morning.
( )	( )	( )	( )	( )	( )	21. Eat the same foods day after day.
( )	( )	( )	( )	( )	( )	22. Think about burning up calories when I exercise
( )	( )	( )	( )	( )	( )	23. Have regular menstrual periods.
( )	( )	( )	( )	( )	( )	24. Other people think that I am too thin.
( )	( )	( )	( )	( )	( )	25. Am preoccupied with the thought of having fat on my body.

ALWAYS	VERY OFTEN	OFTEN	SOMETIMES	RARELY	NEVER	
( )	( )	( )	( )	( )	( )	26. Take longer than others to eat my meals.
( )	( )	( )	( )	( )	( )	27. Enjoy eating at restaurants.
( )	( )	( )	( )	( )	( )	28. Take laxatives.
( )	( )	( )	( )	( )	( )	29. Avoid foods with sugar in them.
( )	( )	( )	( )	( )	( )	30. Eat diet foods.
( )	( )	( )	( )	( )	( )	31. Feel that food controls my life.
( )	( )	( )	( )	( )	( )	32. Display self control around food.
( )	( )	( )	( )	( )	( )	33. Feel that others pressure me to eat.
( )	( )	( )	( )	( )	( )	34. Give too much time and thought to food.
( )	( )	( )	( )	( )	( )	35. Suffer from constipation.
( )	( )	( )	( )	( )	( )	36. Feel uncomfortable after eating sweets.
( )	( )	( )	( )	( )	( )	37. Engage in dieting behaviour.
( )	( )	( )	( )	( )	( )	38. Like my stomach to be empty.
( )	( )	( )	( )	( )	( )	39. Enjoy trying new rich foods.
( )	( )	( )	( )	( )	( )	40. Have the impulse to vomit after meals.

EXERCISE DEPENDENCE QUESTIONNA

Name: .....

Age ..... Sex ..... Weight ..... Height .....

We would like to know how much you exercise. Please consider exercise as being any structured activity which increases your heart rate eg. running, cycling, aerobics, weight training and complete the following sentence:

I exercise for ..... hours per week.

Below are a series of statements that people have used to describe their attitudes to exercise. Please rate each of the statements by circling the appropriate number for how much it describes your attitude to your own exercise over the past month. Please use the following scale:

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

1/ My level of exercising makes me tired at work	1	2	3	4	5	6	7
2/ After an exercise session I feel happier about life	1	2	3	4	5	6	7
3/ If I cannot exercise I feel irritable	1	2	3	4	5	6	7
4/ The rest of my life has to fit in around my exercise	1	2	3	4	5	6	7
5/ After an exercise session I feel less anxious	1	2	3	4	5	6	7
6/ I exercise to look attractive	1	2	3	4	5	6	7
7/ I sometimes miss time at work to exercise	1	2	3	4	5	6	7
8/ After an exercise session I feel that I am a better person	1	2	3	4	5	6	7
9/ If I cannot exercise I feel agitated	1	2	3	4	5	6	7
10/ I exercise to meet other people	1	2	3	4	5	6	7
11/ I hate not being able to exercise	1	2	3	4	5	6	7
12/ I exercise to keep me occupied	1	2	3	4	5	6	7

13/ If I cannot exercise I feel I cannot cope with life	1	2	3	4	5	6	7
14/ I exercise to control my weight	1	2	3	4	5	6	7
15/ I have little energy for my partner, family and friends	1	2	3	4	5	6	7
16/ Being thin is the most important thing in my life	1	2	3	4	5	6	7
17/ I feel guilty about the amount I exercise	1	2	3	4	5	6	7
18/ I exercise to be healthy	1	2	3	4	5	6	7
19/ After an exercise session I feel thinner	1	2	3	4	5	6	7
20/ My level of exercise has become a problem	1	2	3	4	5	6	7
21/ I make a decision to exercise less but cannot stick to it	1	2	3	4	5	6	7
22/ I exercise for the same amount of time each week	1	2	3	4	5	6	7
23/ After an exercise session I feel more positive about myself	1	2	3	4	5	6	7
24/ My weekly pattern of exercise is repetitive	1	2	3	4	5	6	7
25/ My pattern of exercise interferes with my social life	1	2	3	4	5	6	7
26/ I exercise to feel fit	1	2	3	4	5	6	7
27/ My exercising is ruining my life	1	2	3	4	5	6	7
28/ I exercise to prevent heart disease and other illnesses	1	2	3	4	5	6	7
29/ If I cannot exercise I miss the social life	1	2	3	4	5	6	7

FACTORS ON EDQ

Exercise Dependence Questionnaire

Ogden, J., Veale, D., Summers, Z. (1993). The Development and Validation of the Exercise Dependence Questionnaire. Paper presented at the European Congress on Cognitive Behavioural Therapy. London.

The questionnaire is scored by computing a total score and by examining the individual factors. The factors and their items are as follows:

Factor 1 - Interference with social/family life
1/ My level of exercising makes me tired at work
4/ The rest of my life has to fit in around my exercise
7/ I sometimes miss time at work to exercise
15/ I have little energy for my partner, family and friends
25/ My pattern of exercise interferes with my social life

Factor 2 - Positive reward
2/ After an exercise session I feel happier about life
5/ After an exercise session I feel less anxious
8/ After an exercise session I feel that I am a better person
23/ After an exercise session I feel more positive about myself

Factor 3 - Withdrawal symptoms
3/ If I cannot exercise I feel irritable
9/ If I cannot exercise I feel agitated
11/ I hate not being able to exercise
13/ If I cannot exercise I feel I cannot cope with life

Factor 4 - Weight Control
6/ I exercise to look attractive
14/ I exercise to control my weight
16/ Being thin is the most important thing in my life
19/ After an exercise session I feel thinner

Factor 5 - Insight
17/ I feel guilty about the amount I exercise
20/ My level of exercise has become a problem
21/ I make a decision to exercise less but cannot stick to it
27/ My exercising is ruining my life

Factor 6 - Social reasons
10/ I exercise to meet other people
12/ I exercise to keep me occupied
29/ If I cannot exercise I miss the social life

Factor 7 - Health reasons
18/ I exercise to be healthy
26/ I exercise to feel fit
28/ I exercise to prevent heart disease and other illnesses

Factor 8 - Stereotyped behaviour
22/ I exercise for the same amount of time each week
24/ My weekly pattern of exercise is repetitive

EDI 7.

PRIVATE AND CONFIDENTIAL

Name.....Date.....

Age.....Sex.....

Present Weight.....Height.....

Instructions

This is a scale which measures a variety of attitudes, feelings and behaviours. Some of the items relate to food and eating. Others ask you about your feelings about yourself. THERE ARE NO RIGHT OR WRONG ANSWERS SO TRY VERY HARD TO BE COMPLETELY HONEST IN YOUR ANSWERS. RESULTS ARE COMPLETELY CONFIDENTIAL. Read each question and place an (X) under the column which applies best for you. Please answer each question very carefully. Thank you.

		ALWAYS	USUALLY	OFTEN	SOMETIMES	RARELY	NEVER
1.	I eat sweets and carbohydrates without feeling nervous.	( )	( )	( )	( )	( )	( )
2.	I think that my stomach is too big.	( )	( )	( )	( )	( )	( )
3.	I wish I could return to the security of childhood.	( )	( )	( )	( )	( )	( )
4.	I eat when I am upset	( )	( )	( )	( )	( )	( )
5.	I stuff myself with food	( )	( )	( )	( )	( )	( )
6.	I wish I could be younger	( )	( )	( )	( )	( )	( )
7.	I think about dieting	( )	( )	( )	( )	( )	( )
8.	I get frightened when my feelings are strong.	( )	( )	( )	( )	( )	( )
9.	I think my thighs are too large	( )	( )	( )	( )	( )	( )
10.	I feel ineffective as a person	( )	( )	( )	( )	( )	( )
11.	I feel extremely guilty after over-eating.	( )	( )	( )	( )	( )	( )
12.	I think my stomach is just the right size.	( )	( )	( )	( )	( )	( )
13.	Only outstanding performance is good enough in my family.	( )	( )	( )	( )	( )	( )
14.	The happiest time in life is when you are a child.	( )	( )	( )	( )	( )	( )
15.	I am open about my feelings	( )	( )	( )	( )	( )	( )
16.	I am terrified about gaining weight	( )	( )	( )	( )	( )	( )
17.	I trust others	( )	( )	( )	( )	( )	( )
18.	I feel alone in the world	( )	( )	( )	( )	( )	( )

8.

		ALWAYS	USUALLY	OFTEN	SOMETIMES	RARELY	NEVER
19.	I feel satisfied with the shape of my body	( )	( )	( )	( )	( )	( )
20.	I feel generally in control of things in my life.	( )	( )	( )	( )	( )	( )
21.	I get confused about what emotion I am feeling	( )	( )	( )	( )	( )	( )
22.	I would rather be an adult than a child	( )	( )	( )	( )	( )	( )
23.	I can communicate with others easily	( )	( )	( )	( )	( )	( )
24.	I wish I were someone else	( )	( )	( )	( )	( )	( )
25.	I exaggerate or magnify the importance of weight	( )	( )	( )	( )	( )	( )
26.	I can clearly identify what emotion I am feeling	( )	( )	( )	( )	( )	( )
27.	I feel inadequate	( )	( )	( )	( )	( )	( )
28.	I have gone on eating binges where I have felt that I could not stop	( )	( )	( )	( )	( )	( )
29.	As a child, I tried very hard to avoid disappointing my parents and teachers	( )	( )	( )	( )	( )	( )
30.	I have close relationships	( )	( )	( )	( )	( )	( )
31.	I like the shape of my buttocks	( )	( )	( )	( )	( )	( )
32.	I am preoccupied with the desire to be thinner	( )	( )	( )	( )	( )	( )
33.	I don't know what's going on inside me	( )	( )	( )	( )	( )	( )
34.	I have trouble expressing my emotions to others	( )	( )	( )	( )	( )	( )
35.	The demands of adulthood are too great	( )	( )	( )	( )	( )	( )
36.	I hate being less than best at things	( )	( )	( )	( )	( )	( )
37.	I feel secure about myself	( )	( )	( )	( )	( )	( )
38.	I think about bingeing (overeating)	( )	( )	( )	( )	( )	( )
39.	I feel happy that I am not a child anymore	( )	( )	( )	( )	( )	( )
40.	I get confused as to whether or not I am hungry	( )	( )	( )	( )	( )	( )
41.	I have a low opinion of myself	( )	( )	( )	( )	( )	( )
42.	I feel that I can achieve my standards	( )	( )	( )	( )	( )	( )
43.	My parents have expected excellence of me.	( )	( )	( )	( )	( )	( )
44.	I worry that my feelings will get out of control	( )	( )	( )	( )	( )	( )
45.	I think my hips are too big	( )	( )	( )	( )	( )	( )
46.	I eat moderately in front of others and stuff myself when they're gone	( )	( )	( )	( )	( )	( )

	ALWAYS	USUALLY	OFTEN	SOMETIMES	RARELY	NEVER
47. I feel bloated after eating a small meal	( )	( )	( )	( )	( )	( )
48. I feel that people are happiest when they are children.	( )	( )	( )	( )	( )	( )
49. If I gain a pound, I worry that I will keep gaining.	( )	( )	( )	( )	( )	( )
50. I feel I am a worthwhile person	( )	( )	( )	( )	( )	( )
51. When I'm upset, I don't know if I am sad, frightened or angry.	( )	( )	( )	( )	( )	( )
52. I feel that I must do things perfectly or not at all.	( )	( )	( )	( )	( )	( )
53. I have the thought of trying to vomit in order to lose weight.	( )	( )	( )	( )	( )	( )
54. I need to keep people at a certain distance (I feel uncomfortable if someone tries to get too close)	( )	( )	( )	( )	( )	( )
55. I think my thighs are just the right size.	( )	( )	( )	( )	( )	( )
56. I feel empty inside (emotionally)	( )	( )	( )	( )	( )	( )
57. I can talk about personal thoughts or feelings	( )	( )	( )	( )	( )	( )
58. The best years of your life are when you become an adult	( )	( )	( )	( )	( )	( )
59. I think my buttocks are too large	( )	( )	( )	( )	( )	( )
60. I have feelings I can't quite identify	( )	( )	( )	( )	( )	( )
61. I eat or drink in secrecy	( )	( )	( )	( )	( )	( )
62. I think my hips are just the right size	( )	( )	( )	( )	( )	( )
63. I have extremely high goals	( )	( )	( )	( )	( )	( )
64. When I am upset, I worry that I will start eating.	( )	( )	( )	( )	( )	( )

COMPETITIVENESS 10
QUESTIONNAIRE

NAME: .....

Listed below are a series of statements about success. Please respond by circling the appropriate number for the following scale:

1	2	3	4	5
never	rarely	sometimes	usually	always

1.	It is important for me to do better than others.	1	2	3	4	5
2.	Success is not very important to me.	1	2	3	4	5
3.	By achieving success I also get other things which are important to me.	1	2	3	4	5
4.	To succeed one must compete against others.	1	2	3	4	5
5.	People who succeed are more likely to have satisfying lives.	1	2	3	4	5
6.	Success is something I am willing to work hard for.	1	2	3	4	5
7.	I enjoy the challenge of competing against others to succeed.	1	2	3	4	5
8.	The rewards of success outweigh the costs.	1	2	3	4	5
9.	Success is my major goal in life.	1	2	3	4	5
10.	I am happier when I am not striving to succeed.	1	2	3	4	5
11.	I feel better about myself when I am working toward success.	1	2	3	4	5

APPENDIX 2

MULTIPLE CORRELATIONS

APPENDIX 2

TABLE A

CORRELATIONS BETWEEN VARIABLES FOR BALLET DANCERS

	EAT	EDQ	WC	CQ	PR	DT	BU	BD	BMI	AGE
EAT	**1.00**	**0.45**	**0.45**	-0.1	0.15	**0.87**	**0.60**	**0.55**	0.10	0.15
EDQ	**0.45**	**1.00**	**0.74**	0.27	0.22	0.32	**0.50**	0.34	-0.2	0.13
WC	**0.45**	**0.75**	**1.00**	0.07	0.05	**0.43**	**0.48**	**0.38**	-0.0	0.08
CQ	-0.1	0.27	0.07	**1.00**	**0.67**	-0.2	0.14	-0.2	-0.3	-0.2
PR	0.15	0.22	0.05	**0.68**	**1.00**	0.13	0.28	0.03	-0.3	0.00
DT	**0.87**	0.32	**0.43**	-0.2	0.13	**1.00**	**0.53**	**0.62**	0.23	0.12
BU	**0.60**	**0.50**	**0.48**	0.14	0.28	**0.53**	**1.00**	0.35	0.06	0.16
BD	**0.55**	0.35	**0.38**	-0.2	0.03	**0.62**	0.35	**1.00**	**0.39**	0.24
BMI	0.10	-0.2	-0.0	-0.3	-0.3	0.23	0.06	**0.39**	**1.00**	0.19
AGE	0.15	0.13	0.09	-0.2	0.00	0.12	0.16	0.24	0.19	**1.00**

NOTE: Figures in **BOLD** are significant at ($p<0.05$).

EAT = Eating Attitudes Test
EDQ = Total score on the Exercise Dependence Questionnaire
WC = Weight Control subscale of the EDQ
CQ = Competitiveness Questionnaire
PR = Perfectionism on EDI
DT = Drive for Thinnness on EDI
BU = Bulimia on EDI
BD = Body Dissatisfaction on EDI
BMI = Body Mass Index

TABLE B

CORRELATIONS BETWEEN VARIABLES FOR ALL SWIMMERS

	EAT	EDQ	WC	CQ	PR	DT	BU	BD	BMI	AGE
EAT	**1.00**	**0.49**	**0.56**	0.29	**0.38**	**0.82**	**0.73**	**0.71**	**0.43**	0.06
EDQ	**0.49**	**1.00**	**0.72**	**0.73**	**0.45**	**0.46**	**0.42**	**0.38**	0.18	0.17
WC	**0.56**	**0.72**	**1.00**	**0.54**	0.33	**0.53**	**0.43**	**0.50**	**0.45**	**0.34**
CQ	0.29	**0.73**	**0.54**	**1.00**	**0.58**	0.28	0.26	0.26	0.03	-0.1
PR	**0.38**	**0.45**	0.33	**0.58**	**1.00**	0.28	0.29	0.26	0.17	0.09
DT	**0.82**	**0.46**	**0.52**	0.28	0.28	**1.00**	**0.72**	**0.73**	**0.38**	0.14
BU	**0.73**	**0.42**	**0.43**	0.26	0.29	**0.72**	**1.00**	**0.46**	**0.36**	0.04
BD	**0.71**	**0.38**	**0.50**	0.26	0.26	**0.73**	**0.46**	**1.00**	0.30	0.08
BMI	**0.43**	0.18	**0.45**	0.03	0.17	**0.38**	**0.36**	0.30	**1.00**	**0.47**
AGE	0.06	0.17	**0.34**	-0.1	0.09	0.14	0.04	0.08	**0.47**	**1.00**

NOTE: Figures in **BOLD** are significant at ($p<0.05$)

EAT = Eating Attitudes Test
EDQ = Total score on the Exercise Dependence Questionnaire
WC = Weight Control subscale of the EDQ
CQ = Competitiveness Questionnaire
PR = Perfectionism on EDI
DT = Drive for Thinnness on EDI
BU = Bulimia on EDI
BD = Body Dissatisfaction on EDI
BMI = Body Mass Index

TABLE C

CORRELATIONS BETWEEN VARIABLES FOR MUSIC STUDENTS

	EAT	EDQ	WC	CQ	PR	DT	BU	BD	BMI	AGE
EAT	**1.00**	**0.60**	**0.64**	0.28	0.30	**0.86**	**0.62**	**0.58**	0.20	-0.1
EDQ	**0.60**	**1.00**	**0.84**	0.12	0.19	**0.55**	0.30	**0.42**	**0.37**	0.05
WC	**0.64**	**0.84**	**1.00**	0.18	0.21	**0.66**	**0.44**	**0.52**	0.24	0.10
CQ	0.28	0.11	0.18	**1.00**	**0.69**	0.29	0.31	0.16	0.11	0.08
PR	0.30	0.19	0.21	**0.69**	**1.00**	0.22	0.27	0.15	0.05	0.21
DT	**0.86**	**0.55**	**0.66**	0.29	0.22	**1.00**	**0.74**	**0.74**	**0.35**	-0.1
BU	**0.62**	0.30	**0.44**	0.31	0.27	**0.74**	**1.00**	**0.65**	0.24	0.03
BD	**0.58**	**0.42**	**0.52**	0.16	0.15	**0.74**	**0.65**	**1.00**	**0.51**	0.06
BMI	0.20	**0.37**	0.24	0.11	0.05	**0.35**	0.24	**0.51**	**1.00**	-0.2
AGE	-0.1	0.05	0.10	0.08	0.20	-0.0	0.03	0.06	-0.2	**1.00**

NOTE: Figures in **BOLD** are significant at ($p<0.05$)

EAT = Eating Attitudes Test
EDQ = Total score on the Exercise Dependence Questionnaire
WC = Weight Control subscale of the EDQ
CQ = Competitiveness Questionnaire
PR = Perfectionism on EDI
DT = Drive for Thinnness on EDI
BU = Bulimia on EDI
BD = Body Dissatisfaction on EDI
BMI = Body Mass Index

TABLE D

CORRELATIONS BETWEEN VARIABLES FOR PSYCHOLOGY STUDENTS

	EAT	EDQ	WC	CQ	PR	DT	BU	BD	BMI	AGE
EAT	**1.00**	**0.36**	**0.65**	0.13	0.22	**0.87**	**0.78**	**0.67**	0.11	-0.1
EDQ	**0.36**	**1.00**	**0.60**	**0.49**	**0.40**	**0.33**	**0.39**	**0.37**	0.23	-0.0
WC	**0.65**	**0.60**	**1.00**	**0.47**	0.23	**0.69**	**0.57**	**0.53**	0.09	0.01
CQ	0.13	**0.49**	**0.47**	**1.00**	**0.44**	0.19	**0.30**	0.19	0.14	0.05
PR	0.22	**0.40**	0.26	**0.44**	**1.00**	**0.33**	0.20	0.20	**0.30**	-0.1
DT	**0.87**	**0.33**	**0.69**	0.19	**0.33**	**1.00**	**0.71**	**0.72**	0.16	-0.1
BU	**0.78**	**0.39**	**0.57**	**0.30**	0.20	**0.71**	**1.00**	**0.59**	0.23	-0.1
BD	**0.67**	**0.37**	**0.53**	0.19	0.19	**0.72**	**0.59**	**1.00**	**0.31**	-0.0
BMI	0.11	0.23	0.09	0.14	**0.30**	0.16	0.23	**0.31**	**1.00**	0.20
AGE	-0.1	-0.0	0.00	0.04	-0.1	-0.1	-0.1	-0.0	0.20	**1.00**

NOTE: Figures in **BOLD** are significant at ($p<0.05$)

EAT = Eating Attitudes Test
EDQ = Total score on the Exercise Dependence Questionnaire
WC = Weight Control subscale of the EDQ
CQ = Competitiveness Questionnaire
PR = Perfectionism on EDI
DT = Drive for Thinnness on EDI
BU = Bulimia on EDI
BD = Body Dissatisfaction on EDI
BMI = Body Mass Index